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(71)Applicant : **MATSUSHITA ELECTRIC IND CO LTD**
(72)Inventor : **MIYATAKE NORIO**
MURAKAMI MOTOYOSHI
OSHIMA MITSUAKI

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(54) **OPTICAL DISK, METHOD FOR RECORDING/REPRODUCING OPTICAL DISK DRAW INFORMATION, OPTICAL DISK REPRODUCING DEVICE, OPTICAL DISK RECORDING/REPRODUCING DEVICE, OPTICAL DISK DRAW INFORMATION RECORDER AND OPTICAL DISK RECORDER**

(57)Abstract:
PROBLEM TO BE SOLVED: To realize an optical disk having DRAW information usable for copy- right protection such as copy prevention and unfair use prevention of software, etc.
SOLUTION: A recording layer 213 is formed on a disk substrate 211 through a dielectric layer 212. A middle dielectric layer 214, a reflection layer 215 are laminated sequentially

on the recording layer 213, and further, an overcoat layer 216 is formed on it. Plural pieces of BCA (one system of DRAW type discriminative information) parts 220a, 220b are recorded in the disk circumferential direction on the recording layer 213. These BCA parts 220a, 220b are recorded by lowering perpendicular magnetic anisotropy. When reproduced, the DRAW type information is detected by a differential signal.

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CLAIMS

[Claim(s)]
[Claim 1] It is the optical disk equipped with the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction at least on the disk substrate. It has the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. The magnetic anisotropy of the film surface perpendicular direction of said 2nd record section is smaller than the magnetic anisotropy of the film surface perpendicular direction of said 1st record section. The optical disk characterized by being formed as a mark of the stripe configuration where said 2nd record section is long to the disk radial, and arranging two or more said marks at the disk circumferencial direction based on the modulating signal of said postscript information.
[Claim 2] The optical disk according to claim 1 further equipped with the identifier which shows the existence of the existence of the mark train arranged at the disk circumferencial direction. [two or more]
[Claim 3] The optical disk according to claim 2 with which the identifier which shows the existence of the existence of a mark train is recorded in CDC.
[Claim 4] The optical disk according to claim 1 whose specific section equipped with

postscript information is the disk inner circumference section.
[Claim 5] The optical disk according to claim 1 whose difference of the amount of reflected lights from the 1st record section of light and the amount of reflected lights from the 2nd record section which are irradiated is below a predetermined value.
[Claim 6] The optical disk according to claim 5 whose difference of the amount of reflected lights from the 1st record section and the amount of reflected lights from the 2nd record section is 10% or less.
[Claim 7] The optical disk according to claim 1 whose difference of the average refractive index of the 1st record section and the average refractive index of the 2nd record section is 5% or less.
[Claim 8] The magnetic film of the 2nd record section is an optical disk according to claim 1 whose magnetic anisotropy of field inboard is a dominant magnetic film.
[Claim 9] The magnetic film of the 2nd record section is an optical disk according to claim 1 which is the magnetic film which at least the part crystalized.
[Claim 10] The optical disk according to claim 1 with which a recording layer consists of two or more magnetic films by which the laminating was carried out.
[Claim 11] It is the optical disk equipped with the recording layer which consists between two detectable conditions of a thin film which may change reversibly optically at least on the disk substrate. It has the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. The amount of reflected lights from said 1st record section differs from the amount of reflected lights from said 2nd record section. The optical disk characterized by being formed as a mark of the stripe configuration where said 2nd record section is long to the disk radial, and arranging two or more said marks at the disk circumferencial direction based on the modulating signal of said postscript information.
[Claim 12] The optical disk according to claim 11 further equipped with the identifier which shows the existence of the existence of the mark train arranged at the disk circumferencial direction. [two or more]
[Claim 13] The optical disk according to claim 12 with which the identifier which shows the existence of the existence of a mark train is recorded in CDC.
[Claim 14] The optical disk according to claim 11 whose specific section equipped with postscript information is the disk inner circumference section.
[Claim 15] The optical disk according to claim 11 in which a recording layer carries out a phase change reversibly between a crystal phase and an amorphous phase corresponding to the exposure conditions of the light irradiated.
[Claim 16] The optical disk according to claim 15 whose difference of the amount of reflected lights from the 1st record section of light and the amount of reflected lights from the 2nd record section which are irradiated is 10% or more.
[Claim 17] The optical disk according to claim 15 whose difference of the average refractive index of the 1st record section and the average refractive index of the 2nd record section is 5% or more.
[Claim 18] The optical disk according to claim 15 whose 2nd record section of a recording layer is a crystal phase.
[Claim 19] The optical disk according to claim 15 with which a recording layer consists of a germanium-Sb-Te alloy.
[Claim 20] The optical disk with which different postscript information for every disk is

recorded, and the watermark creation parameter for creating a watermark at least is recorded on said postscript information while the main information is recorded.
[Claim 21] The optical disk according to claim 20 with which the main information is recorded and postscript information is recorded by removing said reflective film selectively by preparing a concavo-convex bit in the reflective film.
[Claim 22] The optical disk according to claim 20 with which the main information and postscript information are recorded by changing the reflection factor of a recording layer selectively.
[Claim 23] The optical disk according to claim 20 with which the main information is recorded and postscript information is recorded by changing said film surface vertical magnetic anisotropy selectively by changing selectively the direction of magnetization of the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction.
[Claim 24] On a disk substrate, it has at least the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction. And it is the record approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. By irradiating a laser beam at the disk circumferencial direction of the specific section of said recording layer based on the modulating signal of said postscript information So that the magnetic anisotropy of the film surface perpendicular direction of said 2nd record section may become smaller than the magnetic anisotropy of the film surface perpendicular direction of said 1st record section The record approach of the postscript information on the optical disk characterized by forming two or more said 2nd record section in a disk circumferencial direction as a mark of a stripe configuration long to the disk radial.
[Claim 25] The record approach of the postscript information on an optical disk according to claim 24 that an optical disk or a laser beam is rotated while carrying out pulse luminescence of the laser light source based on the modulating signal of the postscript information by which phase encoding was carried out, in case the 2nd record section is formed.
[Claim 26] The record approach of the postscript information on an optical disk according to claim 24 with the reinforcement of a laser beam smaller than the reinforcement of the laser beam which destroys at least one of a disk substrate, a reflecting layer, and the protective layers irradiated in order to have a reflecting layer and a protective layer further and to form the 2nd record section on a disk substrate.
[Claim 27] The record approach of the postscript information on an optical disk according to claim 24 that the reinforcement of a laser beam irradiated in order to form the 2nd record section is the reinforcement which crystallizes a part of recording layer [at least].
[Claim 28] The record approach of the postscript information on an optical disk according to claim 24 with the larger reinforcement of a laser beam irradiated in order to form the 2nd record section than the reinforcement of the laser beam to which a recording layer reaches Curie temperature.
[Claim 29] The record approach of the postscript information on an optical disk according to claim 24 that the reinforcement of a laser beam irradiated in order to form the 2nd record section is the reinforcement which changes the magnetic film of said 1st

record section to a magnetic film with the dominant magnetic anisotropy of field inboard.
[Claim 30] The record approach of the postscript information on the optical disk according to claim 24 which uses an one direction convergent lens and irradiates the laser beam of a rectangular stripe configuration at a recording layer in case the 2nd record section is formed.
[Claim 31] The record approach of the postscript information on an optical disk according to claim 24 that the light source of a laser beam irradiated in order to form the 2nd record section is an YAG laser.
[Claim 32] The record approach of the postscript information on an optical disk according to claim 31 that the field beyond a predetermined value is impressed to a recording layer in case a laser beam is irradiated from an YAG laser.
[Claim 33] The record approach of the postscript information on an optical disk according to claim 32 that the field impressed to a recording layer is more than a 5K oersted.
[Claim 34] On a disk substrate, it has at least the recording layer which consists between two detectable conditions of a thin film which may change reversibly optically. And it is the record approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. By irradiating a laser beam at the disk circumferencial direction of the specific section of said recording layer based on the modulating signal of said postscript information The record approach of the postscript information on the optical disk characterized by forming two or more said 2nd record section in a disk circumferencial direction as a mark of a stripe configuration long to the disk radial so that the amount of reflected lights from said 1st record section may differ from the amount of reflected lights from said 2nd record section.
[Claim 35] The record approach of the postscript information on an optical disk according to claim 34 that an optical disk or a laser beam is rotated while carrying out pulse luminescence of the laser light source based on the modulating signal of the postscript information by which phase encoding was carried out, in case the 2nd record section is formed.
[Claim 36] The record approach of the postscript information on an optical disk according to claim 34 with the reinforcement of a laser beam smaller than the reinforcement of the laser beam which destroys at least one of a disk substrate, a reflecting layer, and the protective layers irradiated in order to have a reflecting layer and a protective layer further and to form the 2nd record section on a disk substrate.
[Claim 37] The record approach of the postscript information on an optical disk according to claim 34 that the reinforcement of a laser beam irradiated in order to form the 2nd record section is the reinforcement which crystallizes a part of recording layer [at least].
[Claim 38] The record approach of the postscript information on the optical disk according to claim 34 which uses an one direction convergent lens and irradiates the laser beam of a rectangular stripe configuration at a recording layer in case the 2nd record section is formed.
[Claim 39] The record approach of the postscript information on an optical disk according to claim 35 that the light source of a laser beam irradiated in order to form the 2nd record section is an YAG laser.

[Claim 40] The record approach of the postscript information on the optical disk which creates a watermark based on Disk ID, superimposes said watermark on specific data, and is recorded as postscript information.
[Claim 41] On a disk substrate, it has at least the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction. And it is the playback approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section where the magnetic anisotropies of a film surface perpendicular direction differ, and the 2nd record section. The playback approach of the postscript information on the optical disk characterized by reproducing said postscript information by carrying out incidence of the laser beam which carried out the linearly polarized light to said specific section, and detecting change of a revolution of the polarization direction of the reflected light from said optical disk, or the transmitted light.
[Claim 42] The playback approach of the postscript information on the optical disk according to claim 41 to which incidence of the laser beam which carried out the linearly polarized light to said specific section is carried out after carrying out package magnetization of the recording layer of said specific section by impressing a larger field than the coercive force of a recording layer to the specific section.
[Claim 43] The playback approach of the postscript information on the optical disk according to claim 41 to which incidence of the laser beam which carried out the linearly polarized light to said specific section is carried out after impressing the field of an one direction to said specific section and arranging the sense of magnetization of the recording layer of said specific section with an one direction, irradiating the laser beam of the fixed quantity of light, and carrying out temperature up of the temperature of the recording layer of said specific section to the specific section more than Curie temperature.
[Claim 44] On a disk substrate, it has at least the recording layer which consists between two detectable conditions of a thin film which may change reversibly optically. And it is the playback approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section where reflection factors differ, and the 2nd record section. The playback approach of the postscript information on the optical disk characterized by reproducing said postscript information by irradiating the laser beam condensed by said specific section, and detecting change of the amount of reflected lights.
[Claim 45] It is overlapped and prepared in the main information record section where the signal of the main information was recorded, and the field of a part of said main information record section. It is the regenerative apparatus of the optical disk equipped with the sub-signal record section where the sub-signal by which the phase encoding modulation was carried out was recorded on the signal of said main information by superimposing. A means to apply revolution phase control to said optical disk, and to reproduce the signal of said main information in said main information record section by the optical head, A 1st recovery means to restore to the signal of said main information and to obtain the data of the main information, A means to reproduce the mixed signal with which the signal and said sub-signal of said main information in said sub-signal record section were mixed as a regenerative signal by said optical head, The regenerative apparatus of the optical disk characterized by having a frequency separation means to

oppress the signal of said main information in said regenerative signal, and to acquire said sub-signal, and a 2nd recovery means to carry out the phase encoding recovery of said sub-signal, and to obtain said subdata.
[Claim 46] The regenerative apparatus of the optical disk according to claim 45 which is a low-frequency-component separation means a frequency-separation means oppresses the high frequency component from the regenerative signal reproduced by the optical head, and acquire a low-frequency regenerative signal, is equipped with the 2nd slice-level setting-out section which creates the 2nd slice level from said low frequency regenerative signal further, and the 2nd level slicer which slices said low frequency regenerative signal with said 2nd slice level, and acquires a binary-ized signal, carries out the phase encoding recovery of said binary-ized signal, and obtains subdata.
[Claim 47] The regenerative apparatus of the optical disk according to claim 46 which the sublow-frequency component separation means by which a time constant is larger than a low-frequency component separation means is formed in the 2nd slice level setting-out section, inputs the low frequency regenerative signal acquired by the regenerative signal or low-frequency component separation means reproduced by said sublow-frequency component separation means by the optical head, extracts the component of a frequency lower than said low frequency regenerative signal, and obtains the 2nd slice level.
[Claim 48] The regenerative apparatus of the optical disk according to claim 45 further equipped with a frequency-conversion means changes into a frequency shaft signal the signal of the main information in the regenerative signal reproduced by the optical head from a time-axis signal, and create the 1st conversion signal, a means create the mixed signal which added or superimposed subinformation on said 1st conversion signal, and a reverse frequency-conversion means change said mixed signal into a time-axis signal from a frequency shaft signal, and create the 2nd conversion signal.
[Claim 49] Incidence of the light which carried out the linearly polarized light to the optical disk using the optical head is carried out. The transmitted light or the reflected light from said optical disk A means to move said optical head to the specific section of said optical disk with which it is the regenerative apparatus of the optical disk detected as change of a revolution of the polarization direction according to the record signal of said optical disk, and postscript information was recorded if needed, The regenerative apparatus of the optical disk characterized by having a means to detect the transmitted light or the reflected light from said specific section as change of a revolution of the polarization direction, and to reproduce said postscript information.
[Claim 50] The detecting signal from the detection light which received light by at least one photo detector of an optical head, Or a means to detect the identifier which shows the existence of the existence of the postscript information from CDC based on the sum signal of the detecting signal from the detection light which received light by said two or more photo detectors is equipped further. The regenerative apparatus of the optical disk according to claim 49 made to move said optical head to the specific section of said optical disk with which said postscript information was recorded if needed when said identifier is detected and existence of said postscript information is checked.
[Claim 51] The regenerative apparatus of the optical disk according to claim 49 further equipped with the recovery means which carries out a phase encoding recovery in case postscript information is reproduced.
[Claim 52] The regenerative apparatus of the optical disk characterized by to have the

signal-regeneration section which is the regenerative apparatus of the optical disk with which different postscript information for every disk is recorded, and reproduces said main information, the postscript information playback section which reproduces said postscript information, and the watermark adjunct which creates a watermark signal based on said postscript information, and is outputted in addition to said main information while the main information was recorded.
[Claim 53] The regenerative apparatus of the optical disk according to claim 52 currently recorded when postscript information changes the reflection factor of the recording layer of an optical disk selectively.
[Claim 54] The regenerative apparatus of the optical disk according to claim 52 currently recorded when the recording layer of an optical disk consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction and postscript information changes said film surface vertical magnetic anisotropy selectively.
[Claim 55] The regenerative apparatus of the optical disk according to claim 52 which superimposes the subinformation which contains a watermark by the watermark adjunct on the signal of the main information.
[Claim 56] The regenerative apparatus of the optical disk according to claim 52 further equipped with a frequency-conversion means changes the signal of the main information into a frequency shaft signal from a time-axis signal, and create the 1st conversion signal, a means create the mixed signal which added or superimposed postscript information on said 1st conversion signal, and a reverse frequency-conversion means change said mixed signal into a time-axis signal from a frequency shaft signal, and create the 2nd conversion signal.
[Claim 57] The regenerative apparatus of the optical disk according to claim 52 further equipped with the MPEG decoder which elongates the main information to a video signal, and a means to input said video signal into a watermark adjunct.
[Claim 58] The regenerative apparatus of the optical disk according to claim 57 of which a code is canceled only when the watermark playback section which reproduces a watermark is equipped further, and the mutual recognition section is prepared for the both sides of an MPEG decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other.
[Claim 59] The regenerative apparatus of the optical disk according to claim 57 by which the composite signal which compounded the main information by the code decoder is inputted into an MPEG decoder.
[Claim 60] The regenerative apparatus of the optical disk according to claim 59 of which a code is canceled only when the watermark playback section which reproduces a watermark is equipped further, and the mutual recognition section is prepared for the both sides of a code decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other.
[Claim 61] To the main record section of the recording layer of an optical disk in which informational record, elimination, and playback are possible A means to reproduce the postscript information which is the record regenerative apparatus of the optical disk which records the main information using a record circuit and an optical head, and was recorded on the specific section of said recording layer by the signal output part of said optical head which detects as change of rotatory polarization, Using said postscript information, by means to record said main information on said main record section as

coding information enciphered with the code encoder, and the signal output part of said optical head, reproduce said postscript information and it sets to a code decoder. The record regenerative apparatus of the optical disk characterized by having compounded said coding information as a decode key, and having a means to reproduce said main information.

[Claim 62] It is the record regenerative apparatus of the optical disk which uses a record circuit and an optical head for the main record section of the recording layer of an optical disk, and records the main information on it. Said main information is equipped with the watermark adjunct which adds a watermark. The postscript information recorded on the specific section of said recording layer is reproduced by said optical head. The record regenerative apparatus of the optical disk characterized by adding said reproduced postscript information to said main information as a watermark by said watermark adjunct, and recording said main information containing a watermark on said main record section.

[Claim 63] The record regenerative apparatus of the optical disk according to claim 62 recorded when the main information changes the reflection factor of a recording layer selectively.

[Claim 64] The record regenerative apparatus of the optical disk according to claim 62 recorded when a recording layer consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction and the main information changes the direction of magnetization of said magnetic film selectively.

[Claim 65] The record regenerative apparatus of the optical disk according to claim 64 played when the main information and postscript information detect change of the direction of magnetization of a recording layer, or change of the magnitude of a film surface vertical magnetic anisotropy as change of rotatory polarization by the optical head.

[Claim 66] The record regenerative apparatus of the optical disk according to claim 62 which superimposes the subinformation which contains a watermark by the watermark adjunct on the signal of the main information.

[Claim 67] The record regenerative apparatus of the optical disk according to claim 62 further equipped with a frequency-conversion means changes the signal of the main information into a frequency shaft signal from a time-axis signal, and create the 1st conversion signal, a means create the mixed signal which added or superimposed postscript information on said 1st conversion signal, and a reverse frequency-conversion means change said mixed signal into a time-axis signal from a frequency shaft signal, and create the 2nd conversion signal.

[Claim 68] The record regenerative apparatus of the optical disk according to claim 62 further equipped with the MPEG decoder which elongates the main information to a video signal, and a means to input said video signal into a watermark adjunct.

[Claim 69] The record regenerative apparatus of the optical disk according to claim 68 of which a code is canceled only when the watermark playback section which reproduces a watermark is equipped further, and the mutual recognition section is prepared for the both sides of an MPEG decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other.

[Claim 70] The record regenerative apparatus of the optical disk according to claim 68 by which the composite signal which compounded the main information by the code decoder

is inputted into an MPEG decoder.
[Claim 71] The record regenerative apparatus of the optical disk according to claim 70 of which a code is canceled only when the watermark playback section which reproduces a watermark is equipped further, and the mutual recognition section is prepared for the both sides of a code decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other.
[Claim 72] The recording apparatus of the postscript information on the optical disk characterized by having a means to record the subinformation which is the recording apparatus of the postscript information on the optical disk which records postscript information on the optical disk with which the main information was recorded, and contains at least one of Disk ID or the watermark creation parameters.
[Claim 73] The recording device of the postscript information on the optical disk according to claim 72 which is recorded when the main information establishes a concavo-convex pit in the reflective film of an optical disk, and is recorded when subinformation removes said reflective film selectively.
[Claim 74] The recording device of the postscript information on the optical disk according to claim 72 which is recorded when the main information changes the reflection factor of the recording layer of an optical disk selectively, and is recorded when subinformation changes the reflection factor of said recording layer selectively.
[Claim 75] The recording device of the postscript information on the optical disk according to claim 72 which the recording layer of an optical disk consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction, is recorded when the main information changes the direction of magnetization of said magnetic film selectively, and is recorded when subinformation changes a film surface vertical magnetic anisotropy selectively.
[Claim 76] The recording apparatus of the optical disk characterized by having a means to create a watermark based on the subinformation which is the recording apparatus of the optical disk with which the main information was recorded, and contains Disk ID, and a means to record the data which superimposed said watermark on specific data.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the recording apparatus of an optical disk at the record approach of the postscript information on the optical disk in which informational record, playback, and elimination are possible, the optical disk which equipped protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, with available postscript information especially, and an optical disk and the playback approach, the regenerative apparatus of an optical disk, the record regenerative apparatus of an optical disk, the recording apparatus of the postscript information on an optical disk, and a list.
[0002]
[Description of the Prior Art] In recent years, moreover, large capacity, the auxiliary

storage unit in which rapid access is possible and its record medium, especially an optical disk have spread quickly in the low price with digitization of the rapid increment in the amount of information processing by development of a computer and information processing system, and an information processing rate and sound, and image information.
[0003] The basic configuration of the conventional optical disk is as follows. That is, on the disk substrate, the recording layer is formed through the dielectric layer. On the recording layer, sequential formation of a medium dielectric layer and the reflecting layer is carried out, and the exaggerated coat layer is further formed on it.
[0004] Below, actuation of the optical disk which has the above configurations is explained. In the case of the optical disk using the perpendicular magnetic anisotropy films which have the magneto-optical effect in a recording layer, informational record and informational elimination heat a recording layer locally by the exposure of a laser beam beyond temperature with the small coercive force more than compensation temperature, or the temperature near Curie temperature, reduce the coercive force of the recording layer in the exposure section, and are performed by making the sense of an external magnetic field magnetized (informational record is performed by the so-called "heat magnetic recording"). Moreover, playback of that record signal irradiates the laser beam of reinforcement smaller than the laser beam at the time of record and elimination at a recording layer, and is performed by detecting the situation (this revolution taking place based on the magneto-optical effect of the so-called Kerr effect and the so-called Faraday effect) which the plane of polarization of the reflected light or the transmitted light rotates according to the record condition of a recording layer, i.e., the sense of magnetization, as luminous-intensity change using an analyzer. In this case, in order to make interference during magnetization of the reverse sense small and to perform high density record, the magnetic material which has a vertical magnetic anisotropy is used for the recording layer of an optical disk.
[0005] Moreover, by using switched connection or the configuration which carried out the laminating one by one while carrying out magnetostatic association as a configuration of a recording layer for two or more magnetic thin films with which an ingredient differs from a presentation, the signal level at the time of information playback is increased, and detecting a regenerative signal is also performed.
[0006] Moreover, by carrying out induction of the local temperature rise or local chemical change by optical absorption when irradiating laser light as an ingredient of a recording layer, the ingredient which can record information is used, at the time of playback, the laser beam from which the time of record, reinforcement, or wavelength differs a local change of a recording layer is irradiated, and detection of a regenerative signal is performed by the reflected light or transmitted light.
[0007]
[Problem(s) to be Solved by the Invention] In this optical disk, protection management of the disk information using postscript information available to protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, is demanded.
[0008] However, with the above configurations, although it was possible to have recorded disk information on a TOC (Control Data) field etc., when disk information was recorded in a pre pit, it became the management for every La Stampa, and there was a trouble that disk information for every user was not manageable.
[0009] Moreover, since it was possible to make easily a change of management

information, i.e., unjust rewriting, (alteration) when recording information using the thin film which consists of a magnetic film or a reversible phase change ingredient, there was a trouble that protection management of the copyright of the contents in an optical disk etc. could not be performed.
[0010] This invention is made in order to solve said technical problem in the conventional technique, and it aims at providing with the recording apparatus of an optical disk the record approach of the postscript information on the optical disk which equipped protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, with available postscript information, and an optical disk and the playback approach, the regenerative apparatus of an optical disk, the record regenerative apparatus of an optical disk, the recording apparatus of the postscript information on an optical disk, and a list.
[0011]
[Means for Solving the Problem] In order to attain said object, the 1st configuration of the optical disk concerning this invention It is the optical disk equipped with the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction at least on the disk substrate. It has the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. The magnetic anisotropy of the film surface perpendicular direction of said 2nd record section is smaller than the magnetic anisotropy of the film surface perpendicular direction of said 1st record section. It is characterized by being formed as a mark of the stripe configuration where said 2nd record section is long to the disk radial, and arranging two or more said marks at the disk circumferencial direction based on the modulating signal of said postscript information. According to the 1st configuration of this optical disk, the optical disk which equipped protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, with available postscript information is realizable.
[0012] Moreover, in the 1st configuration of the optical disk of said this invention, it is desirable that the identifier which shows the existence of the existence of the mark train arranged at the disk circumferencial direction is equipped further. [two or more] According to this desirable example, it can rise in a short time. Moreover, it is desirable that the identifier which shows the existence of the existence of a mark train is recorded in CDC in this case. Since according to this desirable example it turns out whether postscript information is recorded when CDC is reproduced, postscript information is certainly reproducible.
[0013] Moreover, in the 1st configuration of the optical disk of said this invention, it is desirable that the specific section equipped with postscript information is the disk inner circumference section. According to this desirable example, the location in the disk radial of an optical head can be measured using the stopper of an optical head, or the address information of a pit signal.
[0014] Moreover, in the 1st configuration of the optical disk of said this invention, it is desirable that the difference of the amount of reflected lights from the 1st record section of light and the amount of reflected lights from the 2nd record section which are irradiated is below a predetermined value, and it is desirable especially that the difference of the amount of reflected lights from the 1st record section and the amount of reflected lights from the 2nd record section is 10% or less. According to this desirable example,

the fluctuation of a playback wave accompanying change of the amount of reflected lights can be suppressed.
[0015] Moreover, in the 1st configuration of the optical disk of said this invention, it is desirable that the difference of the average refractive index of the 1st record section and the average refractive index of the 2nd record section is 5% or less. According to this desirable example, the difference of the amount of reflected lights from the 1st record section and the amount of reflected lights from the 2nd record section can be set up to 10% or less.
[0016] Moreover, as for the magnetic film of the 2nd record section, in the 1st configuration of the optical disk of said this invention, it is desirable that the magnetic anisotropy of field inboard is a dominant magnetic film. According to this desirable example, the regenerative signal of the 1st record section which is postscript information can be acquired using the reader which has a polarizer and an analyzer. For this reason, postscript information is promptly detectable even if it does not use an optical head.
[0017] Moreover, as for the magnetic film of the 2nd record section, in the 1st configuration of the optical disk of said this invention, it is desirable that it is the magnetic film which at least the part crystallized. According to this desirable example, since most magnetic anisotropies of the film surface perpendicular direction of the 2nd record section can be vanished, a regenerative signal is certainly detectable as a difference of the polarization direction with the 1st record section.
[0018] Moreover, in the 1st configuration of the optical disk of said this invention, it is desirable that a recording layer consists of two or more magnetic films by which the laminating was carried out. Since the magnetic super resolution method called "FAD" as a playback system can be used according to this desirable example, it becomes reproducible [the signal in a field smaller than a laser beam spot].
[0019] Moreover, the 2nd configuration of the optical disk concerning this invention It is the optical disk equipped with the recording layer which consists between two detectable conditions of a thin film which may change reversibly optically at least on the disk substrate. It has the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. The amount of reflected lights from said 1st record section differs from the amount of reflected lights from said 2nd record section. It is characterized by being formed as a mark of the stripe configuration where said 2nd record section is long to the disk radial, and arranging two or more said marks at the disk circumferencial direction based on the modulating signal of said postscript information. According to the 2nd configuration of this optical disk, the optical disk which equipped protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, with available postscript information is realizable.
[0020] Moreover, in the 2nd configuration of the optical disk of said this invention, it is desirable that the identifier which shows the existence of the existence of the mark train arranged at the disk circumferencial direction is equipped further. [two or more] Moreover, it is desirable that the identifier which shows the existence of the existence of a mark train is recorded in CDC in this case.
[0021] Moreover, in the 2nd configuration of the optical disk of said this invention, it is desirable that the specific section equipped with postscript information is the disk inner circumference section. Moreover, in the 2nd configuration of the optical disk of said this

invention, it is desirable that a recording layer carries out a phase change reversibly between a crystal phase and an amorphous phase corresponding to the exposure conditions of the light irradiated. According to this desirable example, while information is recordable using the difference in the optical property based on a reversible structural change on the atomic level between a crystal phase and an amorphous phase, information is reproducible as a difference of the amount of reflected lights to specific wavelength, or the amount of transmitted lights. Moreover, it is desirable that the difference of the amount of reflected lights from the 1st record section of light and the amount of reflected lights from the 2nd record section which are irradiated is 10% or more in this case. According to this desirable example, the regenerative signal of the 1st record section which is postscript information can be acquired certainly. Moreover, it is desirable that the difference of the average refractive index of the 1st record section and the average refractive index of the 2nd record section is 5% or more in this case. According to this desirable example, the difference of the amount of reflected lights from the 1st record section and the amount of reflected lights from the 2nd record section can be set up to 10% or more. Moreover, it is desirable that the 2nd record section of a recording layer is a crystal phase in this case. According to this desirable example, it is recordable by excessive laser power. Moreover, since the amount of reflected lights of a crystal phase can be enlarged, detection of a regenerative signal becomes easy. Moreover, it is desirable that a recording layer consists of a germanium-Sb-Te alloy in this case.

[0022] Moreover, the 3rd configuration of the optical disk concerning this invention is characterized by recording different postscript information for every disk, and recording the watermark creation parameter for creating a watermark at least on said postscript information while the main information is recorded. According to the 3rd configuration of this optical disk, the following operations can be done so. If the watermark creation parameter and Disk ID are recorded on postscript information, it will become impossible that is, to guess a watermark by the operation from Disk ID, where correlation with Disk ID and a watermark creation parameter is completely abolished. For this reason, it can prevent that an illegal copy contractor publishes new ID and publishes a watermark unjustly.

[0023] Moreover, in the 3rd configuration of the optical disk of said this invention, it is desirable by preparing a concavo-convex bit in the reflective film that the main information is recorded and postscript information is recorded by removing said reflective film selectively.

[0024] Moreover, in the 3rd configuration of the optical disk of said this invention, it is desirable by changing the reflection factor of a recording layer selectively that the main information and postscript information are recorded.

[0025] Moreover, in the 3rd configuration of the optical disk of said this invention, it is desirable that the main information is recorded and postscript information is recorded by changing said film surface vertical magnetic anisotropy selectively by changing selectively the direction of magnetization of the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction.

[0026] Moreover, the 1st record approach of the postscript information on the optical disk concerning this invention On a disk substrate, it has at least the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction. And it is the record approach of the postscript information on the

optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. By irradiating a laser beam at the disk circumferencial direction of the specific section of said recording layer based on the modulating signal of said postscript information It is characterized by forming two or more said 2nd record section in a disk circumferencial direction as a mark of a stripe configuration long to the disk radial so that the magnetic anisotropy of the film surface perpendicular direction of said 2nd record section may become smaller than the magnetic anisotropy of the film surface perpendicular direction of said 1st record section. According to the 1st record approach of the postscript information on this optical disk, postscript information available to protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, is efficiently recordable on an optical disk.
[0027] Moreover, in the 1st record approach of the postscript information on said this invention, in case the 2nd record section is formed, while carrying out pulse luminescence of the laser light source based on the modulating signal of the postscript information by which phase encoding was carried out, it is desirable to rotate an optical disk or a laser beam. According to this desirable example, by using especially the clock of a revolution sensor, revolution nonuniformity can be lost and little postscript information on fluctuation of a channel clock period can be recorded.
[0028] Moreover, in the 1st record approach of the postscript information on said this invention, a thing with the reinforcement of a laser beam smaller than the reinforcement of the laser beam which destroys at least one of a disk substrate, a reflecting layer, and the protective layers irradiated in order to have a reflecting layer and a protective layer further and to form the 2nd record section on a disk substrate is desirable. According to this desirable example, it becomes possible to record postscript information in a software firm or a dealer.
[0029] Moreover, in the 1st record approach of the postscript information on said this invention, it is desirable that the reinforcement of a laser beam irradiated in order to form the 2nd record section is the reinforcement which crystallizes a part of recording layer [at least]. According to this desirable example, since the magnetic anisotropy of the film surface perpendicular direction of a recording layer cannot be restored, the alteration of postscript information can be prevented.
[0030] Moreover, in the 1st record approach of the postscript information on said this invention, a thing with the larger reinforcement of a laser beam irradiated in order to form the 2nd record section than the reinforcement of the laser beam to which a recording layer reaches Curie temperature is desirable. If especially the reinforcement of a laser beam is excessive according to this desirable example, it is possible to fall or vanish the magnetic anisotropy of the film surface perpendicular direction of a recording layer.
[0031] Moreover, in the 1st record approach of the postscript information on said this invention, it is desirable that the reinforcement of a laser beam irradiated in order to form the 2nd record section is the reinforcement which changes the magnetic film of said 1st record section to a magnetic film with the dominant magnetic anisotropy of field inboard.
[0032] Moreover, in the 1st record approach of the postscript information on said this invention, in case the 2nd record section is formed, it is desirable to use an one direction convergent lens and to irradiate the laser beam of a rectangular stripe configuration at a recording layer.
[0033] Moreover, in the 1st record approach of the postscript information on said this

invention, it is desirable that the light source of a laser beam irradiated in order to form the 2nd record section is an YAG laser. Moreover, in this case, in case a laser beam is irradiated from an YAG laser, it is desirable to impress the field beyond a predetermined value to a recording layer. According to this desirable example, after arranging the sense of magnetization of a recording layer with an one direction vertical to a film surface, postscript information is easily recordable by changing a film surface vertical magnetic anisotropy selectively. In this case, it is still more desirable that the field impressed to a recording layer is more than a 5K oersted.
[0034] Moreover, the 2nd record approach of the postscript information on the optical disk concerning this invention On a disk substrate, it has at least the recording layer which consists between two detectable conditions of a thin film which may change reversibly optically. And it is the record approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section and the 2nd record section. By irradiating a laser beam at the disk circumferencial direction of the specific section of said recording layer based on the modulating signal of said postscript information It is characterized by forming two or more said 2nd record section in a disk circumferencial direction as a mark of a stripe configuration long to the disk radial so that the amount of reflected lights from said 1st record section may differ from the amount of reflected lights from said 2nd record section. According to the 2nd record approach of the postscript information on this optical disk, postscript information available to protection of copyrights, such as duplicate prevention and unauthorized use prevention of software, is efficiently recordable on an optical disk.
[0035] Moreover, in the 2nd record approach of the postscript information on said this invention, in case the 2nd record section is formed, while carrying out pulse luminescence of the laser light source based on the modulating signal of the postscript information by which phase encoding was carried out, it is desirable to rotate an optical disk or a laser beam.
[0036] Moreover, in the 2nd record approach of the postscript information on said this invention, a thing with the reinforcement of a laser beam smaller than the reinforcement of the laser beam which destroys at least one of a disk substrate, a reflecting layer, and the protective layers irradiated in order to have a reflecting layer and a protective layer further and to form the 2nd record section on a disk substrate is desirable.
[0037] Moreover, in the 2nd record approach of the postscript information on said this invention, it is desirable that the reinforcement of a laser beam irradiated in order to form the 2nd record section is the reinforcement which crystallizes a part of recording layer [at least].
[0038] Moreover, in the 2nd record approach of the postscript information on said this invention, in case the 2nd record section is formed, it is desirable to use an one direction convergent lens and to irradiate the laser beam of a rectangular stripe configuration at a recording layer. Moreover, it is desirable that the light source of a laser beam irradiated in this case in order to form the 2nd record section is an YAG laser. Moreover, the 3rd record approach of the postscript information on the optical disk concerning this invention is characterized by what a watermark is created based on Disk ID, and said watermark is superimposed on specific data, and is recorded as postscript information. According to the 3rd record approach of the postscript information on this optical disk, it

becomes possible from postscript information to detect the disk ID of a watermark, and the source of an illegal copy can be clarified.
[0039] Moreover, the 1st playback approach of the postscript information on the optical disk concerning this invention On a disk substrate, it has at least the recording layer which consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction. And it is the playback approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section where the magnetic anisotropies of a film surface perpendicular direction differ, and the 2nd record section. It is characterized by reproducing said postscript information by carrying out incidence of the laser beam which carried out the linearly polarized light to said specific section, and detecting change of a revolution of the polarization direction of the reflected light from said optical disk, or the transmitted light. According to the 1st playback approach of the postscript information on this optical disk, postscript information is easily reproducible.
[0040] Moreover, in the 1st playback approach of the postscript information on said this invention, after carrying out package magnetization of the recording layer of said specific section by impressing a larger field than the coercive force of a recording layer to the specific section, it is desirable to carry out incidence of the laser beam which carried out the linearly polarized light to said specific section. According to this desirable example, the magnitude of a revolution of the polarization direction detected from the 1st record section becomes always fixed, and it is obtained as amplitude by which the regenerative signal by the difference of a revolution of the polarization direction with the 2nd record section was stabilized.
[0041] Moreover, in the 1st playback approach of the postscript information on said this invention, after impressing the field of an one direction to said specific section and arranging the sense of magnetization of the recording layer of said specific section with an one direction, irradiating the laser beam of the fixed quantity of light, and carrying out temperature up of the temperature of the recording layer of said specific section to the specific section more than Curie temperature, it is desirable to carry out incidence of the laser beam which carried out the linearly polarized light to said specific section. According to this desirable example, after recording postscript information, it becomes possible to be stabilized and to reproduce a signal, without receiving effect in a field etc. from the outside.
[0042] Moreover, the 2nd playback approach of the postscript information on the optical disk concerning this invention On a disk substrate, it has at least the recording layer which consists between two detectable conditions of a thin film which may change reversibly optically. And it is the playback approach of the postscript information on the optical disk equipped with the postscript information formed in the specific section of said recording layer of the 1st record section where reflection factors differ, and the 2nd record section. It is characterized by reproducing said postscript information by irradiating the laser beam condensed by said specific section, and detecting change of the amount of reflected lights. According to the 2nd playback approach of the postscript information on this optical disk, postscript information is easily reproducible.
[0043] Moreover, the 1st configuration of the regenerative apparatus of the optical disk concerning this invention It is overlapped and prepared in the main information record section where the signal of the main information was recorded, and the field of a part of

said main information record section. It is the regenerative apparatus of the optical disk equipped with the sub-signal record section where the sub-signal by which the phase encoding modulation was carried out was recorded on the signal of said main information by superimposing. A means to apply revolution phase control to said optical disk, and to reproduce the signal of said main information in said main information record section by the optical head, A 1st recovery means to restore to the signal of said main information and to obtain the data of the main information, A means to reproduce the mixed signal with which the signal and said sub-signal of said main information in said sub-signal record section were mixed as a regenerative signal by said optical head, It is characterized by having a frequency separation means to oppress the signal of said main information in said regenerative signal, and to acquire said sub-signal, and a 2nd recovery means to carry out the phase encoding recovery of said sub-signal, and to obtain said subdata. According to the 1st configuration of the regenerative apparatus of this optical disk, the recovery data of a sub-signal are certainly reproducible.

[0044] Moreover, it sets in the 1st configuration of the regenerative apparatus of the optical disk of said this invention. It is a low-frequency component separation means for a frequency-separation means to oppress the high frequency component from the regenerative signal reproduced by the optical head, and to acquire a low frequency regenerative signal. Furthermore, the 2nd slice level setting-out section which creates the 2nd slice level from said low frequency regenerative signal, It is desirable to have the 2nd level slicer which slices said low frequency regenerative signal with said 2nd slice level, and acquires a binary-ized signal, to carry out the phase encoding recovery of said binary-ized signal, and to obtain subdata. According to this desirable example, the error by fluctuation of the envelope of the regenerative signal of postscript information can be prevented. Moreover, it is desirable for the sublow-frequency component separation means by which a time constant is larger than a low-frequency component separation means to be formed in the 2nd slice level setting-out section, and to input the low frequency regenerative signal acquired by the regenerative signal or low-frequency component separation means reproduced by said sublow-frequency component separation means by the optical head, to extract the component of a frequency lower than said low frequency regenerative signal in this case, and to obtain the 2nd slice level. Since the slice level which followed the level variation of a low-frequency component can be set up according to this desirable example, playback of a signal becomes easy.

[0045] Moreover, it sets in the 1st configuration of the regenerative apparatus of the optical disk of said this invention. A frequency-conversion means to change into a frequency shaft signal the signal of the main information in the regenerative signal reproduced by the optical head from a time-axis signal, and to create the 1st conversion signal, It is desirable to have further a means to create the mixed signal which added or superimposed subinformation on said 1st conversion signal, and a reverse frequency-conversion means to change said mixed signal into a time-axis signal from a frequency shaft signal, and to create the 2nd conversion signal. Since the spread spectrum of the ID signal can be carried out, while being able to prevent degradation of the video signal of the main information according to this desirable example, playback of the main information becomes easy.

[0046] Moreover, the 2nd configuration of the regenerative apparatus of the optical disk concerning this invention Incidence of the light which carried out the linearly polarized

light to the optical disk using the optical head is carried out. The transmitted light or the reflected light from said optical disk A means to move said optical head to the specific section of said optical disk with which it is the regenerative apparatus of the optical disk detected as change of a revolution of the polarization direction according to the record signal of said optical disk, and postscript information was recorded if needed, It is characterized by having a means to detect the transmitted light or the reflected light from said specific section as change of a revolution of the polarization direction, and to reproduce said postscript information. Since it is not influenced [the effect of fluctuation of the amount of reflected lights, and] of the noise component contained as an addition signal according to the 2nd configuration of the regenerative apparatus of this optical disk, detection of a regenerative signal becomes easy.
[0047] Moreover, it sets in the 2nd configuration of the regenerative apparatus of the optical disk of said this invention. The detecting signal from the detection light which received light by at least one photo detector of an optical head, Or a means to detect the identifier which shows the existence of the existence of the postscript information from CDC based on the sum signal of the detecting signal from the detection light which received light by said two or more photo detectors is equipped further. When said identifier is detected and existence of said postscript information is checked, it is desirable to move said optical head to the specific section of said optical disk with which said postscript information was recorded if needed. According to this desirable example, since a stripe, a defect, etc. of postscript information can be distinguished easily, the build up time of equipment can be shortened.
[0048] Moreover, in the 2nd configuration of the regenerative apparatus of the optical disk of said this invention, in case postscript information is reproduced, it is desirable that the recovery means which carries out a phase encoding recovery is equipped further. According to this desirable example, it can use for playback of postscript information, such as ID signal.
[0049] Moreover, the 3rd configuration of the regenerative apparatus of the optical disk concerning this invention is the regenerative apparatus of the optical disk with which different postscript information for every disk is recorded while the main information is recorded, and is characterized by to have the signal-regeneration section which reproduces said main information, the postscript information playback section which reproduces said postscript information, and the watermark adjunct which creates a watermark signal based on said postscript information, and output in addition to said main information. According to the 3rd configuration of the regenerative apparatus of this optical disk, it can prevent copying illegally and taking out the main information, such as a video signal.
[0050] Moreover, in the 3rd configuration of the regenerative apparatus of the optical disk of said this invention, it is desirable to be recorded when postscript information changes the reflection factor of the recording layer of an optical disk selectively.
[0051] Moreover, in the 3rd configuration of the regenerative apparatus of the optical disk of said this invention, it is desirable to be recorded, when the recording layer of an optical disk consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction and postscript information changes said film surface vertical magnetic anisotropy selectively.
[0052] Moreover, in the 3rd configuration of the regenerative apparatus of the optical

disk of said this invention, it is desirable to superimpose the subinformation which contains a watermark by the watermark adjunct on the signal of the main information. According to this desirable example, it can prevent removing subinformation from the main information and reproducing by the usual record regeneration system.
[0053] Moreover, it sets in the 3rd configuration of the regenerative apparatus of the optical disk of said this invention. A frequency-conversion means to change the signal of the main information into a frequency shaft signal from a time-axis signal, and to create the 1st conversion signal, It is desirable to have further a means to create the mixed signal which added or superimposed postscript information on said 1st conversion signal, and a reverse frequency-conversion means to change said mixed signal into a time-axis signal from a frequency shaft signal, and to create the 2nd conversion signal.
[0054] Moreover, in the 3rd configuration of the regenerative apparatus of the optical disk of said this invention, it is desirable to have further the MPEG decoder which elongates the main information to a video signal, and a means to input said video signal into a watermark adjunct. According to this desirable example, without degrading the main information, such as a video signal, the spread spectrum of the watermark can be carried out and it can be added. Moreover, it is desirable to cancel a code, only when the watermark playback section which reproduces a watermark is equipped further in this case, and the mutual recognition section is prepared for the both sides of an MPEG decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other. According to this desirable example, even if it extracts a digital signal from an intermediate bus, since a code is not canceled, it can prevent unjust abatement and an unjust alteration of a watermark. Moreover, it is desirable that the composite signal which compounded the main information by the code decoder is inputted into an MPEG decoder in this case. According to this desirable example, the unjust copy by issuance of inaccurate watermarks, such as ID, can newly be prevented by abolishing correlation with information, such as ID, and a watermark creation parameter. In this case, it is desirable to cancel a code, only when the watermark playback section which reproduces a watermark is equipped further, and the mutual recognition section is prepared for the both sides of a code decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other.
[0055] Moreover, the 1st configuration of the record regenerative apparatus of the optical disk concerning this invention To the main record section of the recording layer of an optical disk in which informational record, elimination, and playback are possible A means to reproduce the postscript information which is the record regenerative apparatus of the optical disk which records the main information using a record circuit and an optical head, and was recorded on the specific section of said recording layer by the signal output part of said optical head which detects as change of rotatory polarization, Using said postscript information, by means to record said main information on said main record section as coding information enciphered with the code encoder, and the signal output part of said optical head, reproduce said postscript information and it sets to a code decoder. It is characterized by having compounded said coding information as a decode key, and having a means to reproduce said main information. According to the 1st configuration of the record regenerative apparatus of this optical disk, since an unjust copy can be prevented, copyright can be protected.
[0056] Moreover, the 2nd configuration of the record regenerative apparatus of the

optical disk concerning this invention It is the record regenerative apparatus of the optical disk which uses a record circuit and an optical head for the main record section of the recording layer of an optical disk, and records the main information on it. Said main information is equipped with the watermark adjunct which adds a watermark. The postscript information recorded on the specific section of said recording layer is reproduced by said optical head. Said reproduced postscript information is added to said main information as a watermark by said watermark adjunct, and it is characterized by recording said main information containing a watermark on said main record section. According to the 2nd configuration of the record regenerative apparatus of this optical disk, since a follow-up survey of record hysteresis can be conducted from the record data of a watermark, an illegal copy and an unauthorized use can be prevented.
[0057] Moreover, in the 2nd configuration of the record regenerative apparatus of the optical disk of said this invention, it is desirable to be recorded when the main information changes the reflection factor of a recording layer selectively.
[0058] Moreover, in the 2nd configuration of the record regenerative apparatus of the optical disk of said this invention, it is desirable to be recorded, when a recording layer consists of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction and the main information changes the direction of magnetization of said magnetic film selectively. Moreover, it is desirable that the main information and postscript information are reproduced in this case by detecting change of the direction of magnetization of a recording layer or change of the magnitude of a film surface vertical magnetic anisotropy as change of rotatory polarization by the optical head.
[0059] Moreover, in the 2nd configuration of the record regenerative apparatus of the optical disk of said this invention, it is desirable to superimpose the subinformation which contains a watermark by the watermark adjunct on the signal of the main information.
[0060] Moreover, it sets in the 2nd configuration of the record regenerative apparatus of the optical disk of said this invention. A frequency-conversion means to change the signal of the main information into a frequency shaft signal from a time-axis signal, and to create the 1st conversion signal, It is desirable to have further a means to create the mixed signal which added or superimposed postscript information on said 1st conversion signal, and a reverse frequency-conversion means to change said mixed signal into a time-axis signal from a frequency shaft signal, and to create the 2nd conversion signal.
[0061] Moreover, in the 2nd configuration of the record regenerative apparatus of the optical disk of said this invention, it is desirable to have further the MPEG decoder which elongates the main information to a video signal, and a means to input said video signal into a watermark adjunct. Moreover, it is desirable to cancel a code, only when the watermark playback section which reproduces a watermark is equipped further in this case, and the mutual recognition section is prepared for the both sides of an MPEG decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other. Moreover, it is desirable that the composite signal which compounded the main information by the code decoder is inputted into an MPEG decoder in this case. In this case, it is desirable to cancel a code, only when the watermark playback section which reproduces a watermark is equipped further, and the mutual recognition section is prepared for the both sides of a code decoder and said watermark playback section, the enciphered main information is transmitted and it attests each other.

[0062] Moreover, the configuration of the recording apparatus of the postscript information on the optical disk concerning this invention is the recording apparatus of the postscript information on the optical disk which records postscript information on the optical disk with which the main information was recorded, and is characterized by having a means to record the subinformation containing at least one of Disk ID or the watermark creation parameters. Since the user who copied illegally and used improperly can be specified from Disk ID or a watermark according to the configuration of the recording apparatus of the postscript information on this optical disk, protection of copyright is attained.
[0063] Moreover, in the configuration of the recording apparatus of the postscript information on the optical disk of said this invention, it is desirable to be recorded when the main information establishes a concavo-convex pit in the reflective film of an optical disk, and to be recorded when subinformation removes said reflective film selectively.
[0064] Moreover, in the configuration of the recording apparatus of the postscript information on the optical disk of said this invention, it is desirable to be recorded when the main information changes the reflection factor of the recording layer of an optical disk selectively, and to be recorded when subinformation changes the reflection factor of said recording layer selectively.
[0065] Moreover, in the configuration of the recording apparatus of the postscript information on the optical disk of said this invention, it is desirable for the recording layer of an optical disk to consist of a magnetic film which has a magnetic anisotropy to a film surface perpendicular direction, to be recorded when the main information changes the direction of magnetization of said magnetic film selectively, and to be recorded when subinformation changes a film surface vertical magnetic anisotropy selectively.
[0066] Moreover, the configuration of the recording apparatus of the optical disk concerning this invention is characterized by having a means to create a watermark based on the subinformation which is the recording apparatus of the optical disk with which the main information was recorded, and contains Disk ID, and a means to record the data which superimposed said watermark on specific data. According to the configuration of the recording apparatus of this optical disk, it becomes possible [it is possible to detect a watermark from the recorded data, and], since hysteresis of contents can be clarified to protect copyright.
[0067]
[Embodiment of the Invention] Hereafter, this invention is explained still more concretely using the gestalt of operation.
<Gestalt of the 1st operation> The structure of a magneto-optic disk is explained first.
[0068] Drawing 1 is the sectional view showing the configuration of the magneto-optic disk in the gestalt of operation of the 1st of this invention. As shown in drawing 1 , on the disk substrate 211, the recording layer 213 is formed through the dielectric layer 212. Two or more BCA (one method of identification information of postscript mold) sections 220a and 220b are recorded on the disk circumferencial direction by the recording layer 213. On the recording layer 213, the laminating of the medium dielectric layer 214 and the reflecting layer 215 is carried out one by one, and the overcoat layer 216 is further formed on it.
[0069] Next, the manufacture approach of the magneto-optic disk in the gestalt of this operation is explained, referring to drawing 8 . First, as shown in drawing 8 (1), the disk

substrate 211 with which the guide rail or pre pit for a tracking guide was formed is produced by the injection-molding method using polycarbonate resin. Subsequently, as shown in drawing 8 (2), the dielectric layer 212 of 80nm of thickness which consists of an SiN film is formed on the disk substrate 211 by performing reactive sputtering to Si target in the ambient atmosphere containing Ar gas and nitrogen gas. Subsequently, as shown in drawing 8 (3), the recording layer 213 of 30nm of thickness which consists of TbFeCo film is formed on a dielectric layer 212 by performing DC sputtering to the alloy target of TbFeCo in Ar gas ambient atmosphere. Subsequently, as shown in drawing 8 (4), the medium dielectric layer 214 of 20nm of thickness which consists of an SiN film is formed on a recording layer 213 by performing reactive sputtering to Si target in the ambient atmosphere containing Ar gas and nitrogen gas. Subsequently, as shown in drawing 8 (5), the reflecting layer 215 of 40nm of thickness which consists of AlTi film is formed on the medium dielectric layer 214 by performing DC sputtering to an AlTi target in Ar gas ambient atmosphere. Finally, as shown in drawing 8 (6), after ultraviolet-rays hardening resin is dropped on a reflecting layer 215, the overcoat layer 216 of 10 micrometers of thickness is formed on a reflecting layer 215 by applying said ultraviolet-rays hardening resin at the rotational frequency of 2500rpm, irradiating ultraviolet rays, and stiffening said ultraviolet-rays hardening resin by the spin coater.
[0070] Next, the record approach of identification information (postscript information) is explained, referring to drawing 9 . First, as shown in drawing 9 (7), the sense of magnetization of a recording layer 213 is arranged with an one direction using the magnetization machine 217. Since the recording layers 213 of the magneto-optic disk of the gestalt of this operation are perpendicular magnetic anisotropy films which have the coercive force of a 11K oersted, they can arrange the sense of magnetization of a recording layer 213 in the direction of the field of the magnetization machine 217 by setting the magnetic field strength of the electromagnet of the magnetization machine 217 as a 15K gauss, and passing the above-mentioned magneto-optic disk for the inside of this field. Subsequently, as shown in drawing 9 (8), using the high power laser 218, such as an YAG laser, and a 1 direction-focusing lens 219 like a cylindrical lens, the laser beam of a rectangular stripe configuration is completed on a recording layer 213, and two or more BCA sections 220a and 220b as identification information are recorded on a disk circumferencial direction. This record principle, a recording method, and a playback system are explained to a detail later. Subsequently, as shown in drawing 9 (9), using the BCA reader 221, the BCA sections 220a and 220b are detected, PE (phase encoding) recovery is carried out, and it collates that it is the right as compared with record data. In being in agreement with record data, record of identification information is completed, and in not being right, it removes this magneto-optic disk from a process.
[0071] Next, the principle of the BCA reader 221 is explained, referring to drawing 10 . As shown in drawing 10 (a) and (c), as for the polarizer 222 and analyzer 223 of the BCA reader 221, plane of polarization lies at right angles mutually. Therefore, as shown in drawing 10 (a) and (b), even if a light beam is irradiated by BCA section 220a of a recording layer 213, since the vertical magnetic anisotropy is low (the magnetic anisotropy of field inboard is dominant), a detecting signal is not outputted for BCA section 220a. However, when a light beam is irradiated by parts other than the BCA section of a recording layer 213 (non-BCA section 224), since the part is magnetized by the one direction vertical to a film surface, the plane of polarization of the reflected light

rotates and a signal is outputted to PD (photodetector)256. Even if a BCA regenerative signal as shown in drawing 10 (b) as mentioned above is acquired and it does not use the optical head for magneto-optic-recording playback, the BCA section 220 is promptly detectable.

[0072] In this case, since the magnetic anisotropy of a direction vertical to a film surface is falling remarkably, as for BCA section 220a, a BCA regenerative signal is acquired. Hereafter, this is explained. Hysteresis loop 225a of the BCA section 220 heat-treated by the identification information of a recording layer 213, i.e., the exposure of a laser beam, by drawing 4 and car hysteresis loop 225b in a direction vertical to the film surface of the non-BCA section 224 which is not heat-treated are shown. As shown in drawing 4 , it turns out that the car angle of rotation and vertical magnetic anisotropy of the BCA section 220 which are heat-treated have deteriorated substantially. Since the remnant magnetism in a perpendicular direction is lost, it becomes impossible thus, to perform a magneto-optic recording in the BCA section 220 heat-treated.

[0073] In addition, although the BCA section 220 as identification information is recorded in the gestalt of this operation after arranging the sense of magnetization of the perpendicular magnetic anisotropy films of a recording layer 213 with an one direction (after magnetizing) as shown in drawing 9 By carrying out the laminating of each class, irradiating stroboscope light etc., after recording the BCA section 220 by degrading a recording layer 213, and raising the temperature of a recording layer 213 It is also possible to arrange the sense of magnetization of the perpendicular magnetic anisotropy films of a recording layer 213 with an one direction, applying a field smaller than the field in the case of magnetizing at a room temperature.

[0074] Moreover, although it has the coercive force of a 11K oersted at a room temperature, if the recording layer 213 of the magneto-optic disk of the gestalt of this operation irradiates stroboscope light, a laser beam, etc. and carries out temperature up to 100 degrees C or more, since coercive force becomes below a 4K oersted, it can arrange the sense of magnetization of a recording layer 213 with an one direction by impressing the field more than a 5K oersted.

[0075] Next, the record power of BCA record of an optical MAG mold is explained. The BCA trimming equipment "a BCA recording apparatus (YAG laser 50W lamp excitation CWQ pulse record)" by Matsushita Electric Industrial Co., Ltd. is used for drawing 5 , and the BCA recording characteristic at the time of recording a BCA signal from the optical charge side side of a magneto-optic disk is shown. The BCA section is not recorded when the record current of laser is below 8A, as shown in drawing 5 . When the record current of laser is 8-9A of the optimal record current, as shown in drawing 5 and drawing 12 (b), BCA image 226a is obtained by only the polarization microscope. This BCA image 226a is not visible in an optical microscope. When the record current of laser is more than 9A, as shown in drawing 5 and drawing 12 (a), the BCA images 226b and 226c are obtained on the both sides of an optical microscope and a polarization microscope. When the record current of the laser shown in drawing 5 is more than 10A, the protective layer (overcoat layer) is destroyed. This condition is shown in drawing 11 . As shown in drawing 11 (a), the reflecting layer 215 and the overcoat layer 216 are destroyed by the charge of excessive laser power. On the other hand, when the record current of laser is 8-9A of the optimal record current, as shown in drawing 11 (b), a reflecting layer 215 and the overcoat layer 216 are not destroyed only by a recording

layer 213 deteriorating.
[0076] Next, the record regenerative apparatus of the magneto-optic disk of the gestalt of this operation is explained, referring to drawing 7 . Drawing 7 is drawing showing the optical configuration of the record regenerative apparatus of the magneto-optic disk in the gestalt of operation of the 1st of this invention. In drawing 7 , 255 is the optical head of a magneto-optic disk. 254 A pulse generator, 241 a collimate lens and 243 for a laser light source and 242 A polarization beam splitter, An objective lens for 244 to condense a laser beam on a magneto-optic disk, The half mirror with which 246 separates the reflected light from a magneto-optic disk in the direction of signal regeneration, and the focal TORRAKKINGU control direction, As for lambda/4 plate which 247 makes rotate the plane of polarization of the reflected light from a magneto-optic disk, the polarization beam splitter into which 248 separates the reflected light from a magneto-optic disk according to the polarization direction, and 249 and 250, a photo detector and 253 are the light sensing portions and control sections of focal TORRAKKINGU. Moreover, as for the magneto-optic disk of the gestalt of this operation, and 251, 240 is [the magnetic head and 252] magnetic-head actuation circuits.
[0077] As shown in drawing 7 , the laser beam of the linearly polarized light injected from the laser light source 241 is changed with a collimate lens 242, and turns into a laser beam of parallel light. Only P polarization passes a polarization beam splitter 243, is condensed with an objective lens 244, and this laser beam is irradiated by the recording layer of a magneto-optic disk 240. At this time, the information on the usual record data (data information) is recorded by changing selectively the direction of magnetization of perpendicular magnetic anisotropy films (facing up and facing down), and the reflected light (or transmitted light) from a magneto-optic disk 240 changes as rotatory polarization according to the magnetization condition by the magneto-optical effect. Thus, the reflected light which carried out rotatory polarization is separated in the direction of signal regeneration, and the direction of focal tracking control by the half mirror 246, after reflecting by the polarization beam splitter 243. A travelling direction is divided into P polarization component and each S polarization component by the polarization beam splitter 248 after plane of polarization rotates 45 degrees of light separated in the direction of signal regeneration with lambda/4 plate 247. The light divided into the 2-way is detected by photo detectors 249 and 250 as each quantity of light. And change of rotatory polarization is detected as a differential signal of the quantity of light detected by two photo detectors 249 and 250, and the regenerative signal of data information is acquired by this differential signal. Moreover, the light of the direction of focal tracking control separated with the half mirror 246 is used for focal control and TORRAKKINGU control of an objective lens 244 by the focal TORRAKKINGU control section 253.
[0078] The BCA section 220 as identification information of the magneto-optic disk of the gestalt of this operation is detected using the playback system of data information, and the same method. As shown in drawing 4 , as for the BCA section 220 heat-treated, the vertical magnetic anisotropy has deteriorated substantially (hysteresis loop 225a). the laser beam which carried out incidence to the large non-BCA section 224 of a vertical magnetic anisotropy which is not heat-treated since the sense of magnetization at the time of production of a recording layer or playback of a signal of perpendicular magnetic anisotropy films was arranged with the one direction -- the sense of magnetization of the plane of polarization -- responding -- an one direction -- thetak only -- it is rotated and

reflected. On the other hand, by heat-treating, in the BCA section 220 in which the vertical magnetic anisotropy has deteriorated substantially, since the car angle of rotation is very small, the laser beam which carried out incidence to the BCA section 220 is reflected, without the plane of polarization hardly rotating.

[0079] There are the following approaches as an approach of arranging the sense of magnetization at the time of playback of the BCA section of perpendicular magnetic anisotropy films with an one direction here. That is, in the record regenerative apparatus of the magneto-optic disk of drawing 7 , the sense of magnetization of the recording layer of the BCA section can be arranged with an one direction by impressing the fixed field of 200 or more oersteds to a magneto-optic disk 240 by the magnetic head 251, irradiating a laser beam 4mW or more so that the recording layer 213 of a magneto-optic disk 240 may become more than Curie temperature.

[0080] Drawing which traced the wave photograph of the differential signal which detected identification information actually to drawing 6 (a) is shown, and drawing which traced the wave photograph of the addition signal which detected identification information actually is shown in drawing 6 (b). As shown in drawing 6 (a), it turns out that the pulse shape of the identification information of gain sufficient in a differential signal is detected. Since a recording layer is change of only magnetic properties at this time, and change of an average refractive index is 5% or less even if it is the case where a part of recording layer crystalizes, fluctuation of the amount of reflected lights from a magneto-optic disk becomes 10% or less. Therefore, the fluctuation of a playback wave accompanying change of the amount of reflected lights is dramatically small.

[0081] The polarization condition of the reflected light to incident light is shown in drawing 13 . As shown in drawing 13 (b), in the BCA section 220 heat-treated, the light of the completely same polarization direction 227b as incident light is reflected. On the other hand, it is angle-of-rotation thetak to incident light by the Kerr effect of the magnetic film which has a vertical magnetic anisotropy in the non-BCA section 224 which is not heat-treated as shown in drawing 13 (a). The light of polarization direction 227a which it has is reflected.

[0082] Moreover, in the gestalt of this operation, although the differential signal has detected identification information, if this playback system is used, since a quantity of light fluctuation component without polarization is mostly cancellable, when reducing the noise by quantity of light fluctuation, it is effective.

[0083] <Gestalt of the 2nd operation> Drawing 2 is the sectional view showing the configuration of the magneto-optic disk in the gestalt of operation of the 2nd of this invention. As shown in drawing 2 , on the disk substrate 231, the recording layer of a three-tiered structure which consists of the playback magnetic film 233, a medium magnetic film 234, and a record magnetic film 235 through a dielectric layer 232 is formed. Two or more BCA sections 220a and 220b are recorded on the disk circumferencial direction by the recording layer. On the recording layer, the laminating of the medium dielectric layer 236 and the reflecting layer 237 is carried out one by one, and the overcoat layer 238 is further formed on it.

[0084] Next, it explains, referring to drawing 8 and drawing 9 which were used with the gestalt of implementation of the above 1st about the manufacture approach of the magneto-optic disk in the gestalt of this operation. First, the disk substrate 231 with which the guide rail or pre pit for a tracking guide was formed is produced by the

injection-molding method using polycarbonate resin. Subsequently, the dielectric layer 232 of 80nm of thickness which consists of an SiN film is formed on the disk substrate 231 by performing reactive sputtering to Si target in the ambient atmosphere containing Ar gas and nitrogen gas. The recording layer is constituted by the playback magnetic film 233 which consists of GdFeCo film which is Curie-temperature Tc1 and coercive force Hc1, the medium magnetic film 234 which consists of TbFe film which is Curie-temperature Tc2 and coercive force Hc2, and the record magnetic film 235 which consists of TbFeCo film which is Curie-temperature Tc3 and coercive force Hc3, and carries out the laminating of each class one by one on a dielectric layer 232 by performing DC sputtering to each alloy target in Ar gas ambient atmosphere. Subsequently, the medium dielectric layer 236 of 20nm of thickness which consists of an SiN film is formed on a recording layer by performing reactive sputtering to Si target in the ambient atmosphere containing Ar gas and nitrogen gas. Subsequently, the reflecting layer 237 of 40nm of thickness which consists of AlTi film is formed on the medium dielectric layer 236 by performing DC sputtering to an AlTi target in Ar gas ambient atmosphere. Finally, after ultraviolet-rays hardening resin is dropped on a reflecting layer 237, the overcoat layer 238 of 8 micrometers of thickness is formed on a reflecting layer 237 by applying said ultraviolet-rays hardening resin at the rotational frequency of 3000rpm, irradiating ultraviolet rays, and stiffening said ultraviolet-rays hardening resin by the spin coater.
[0085] Here, as for the playback magnetic film 233, the coercive force Hc1 in 300 degrees C and a room temperature is set [thickness] as 100 oersteds for 40nm and Curie-temperature Tc1, respectively. Moreover, as for the medium magnetic film 234, the coercive force Hc2 in 120 degrees C and a room temperature is set [thickness] as the 3K oersted for 10nm and Curie-temperature Tc2, respectively. Moreover, as for the record magnetic film 235, the coercive force Hc3 in 230 degrees C and a room temperature is set [thickness] as the 15K oersted for 50nm and Curie-temperature Tc3, respectively.
[0086] Next, the playback principle in the recording layer of the three-tiered structure of the gestalt of this operation is explained, referring to drawing 3 . For a laser beam spot and 230, as for a playback magnetic film and 234, in drawing 3 , a record domain and 233 are [228 / a playback field, and 229a 229b and 229c / a medium magnetic film and 235] record magnetic films. As shown in drawing 3 , the record domain 230 of an information signal is recorded on the record magnetic film 235, and magnetization of the record magnetic film 235 is imprinted by the playback magnetic film 233 at a room temperature according to the switched connection force between the record magnetic film 235, the medium magnetic film 234, and the playback magnetic film 233. At the time of signal regeneration, although, as for low-temperature section 229b of laser beam spot 229a, the signal of the record magnetic film 235 is imprinted by the playback magnetic film 233 In elevated-temperature section 229c of laser beam spot 229a Since the Curie temperature of the medium magnetic film 234 is lower than other magnetic films and the medium magnetic film 234 becomes more than Curie temperature, the switched connection force between the record magnetic film 235 and the playback magnetic film 233 is intercepted, and the direction of magnetization of the playback magnetic film 233 gathers in the direction of the playback field 228. For this reason, the record domain 230 of an information signal will be in the condition that the mask of the elevated-temperature section 229c which is a part of laser beam spot 229a was carried out. Therefore, it

becomes reproducible [a signal] only from low-temperature section 229b of laser beam spot 229a. This playback system is a magnetic super resolution method called "FAD", and becomes reproducible [the signal in a field smaller than a laser beam spot] by using this playback system.
[0087] Moreover, the same playback is attained even if it is the case where the magnetic super resolution method called "RAD" which can reproduce a signal only from the elevated-temperature section of a laser beam spot is used. Next, the record approach of the identification information (postscript information) in the magneto-optic disk of the gestalt of this operation is explained, referring to drawing 9 .
[0088] First, as shown in drawing 9 (7), the sense of magnetization of a recording layer is arranged with an one direction using the magnetization machine 217. Since the record magnetic films 235 of the recording layer of the magneto-optic disk of the gestalt of this operation are perpendicular magnetic anisotropy films which have the coercive force of a 15K oersted, they can arrange the sense of magnetization of a recording layer in the direction of the field of the magnetization machine 217 by setting the magnetic field strength of the electromagnet of the magnetization machine 217 as a 20K gauss, and passing the above-mentioned magneto-optic disk for the inside of this field. Subsequently, as shown in drawing 9 (8), using the high power laser 218, such as an YAG laser, and a 1 direction-focusing lens 219 like a cylindrical lens, the laser beam of a rectangular stripe configuration is completed on a recording layer, and two or more BCA sections 220a and 220b are recorded on a disk circumferencial direction. This record principle, the recording method, and the playback system are the same as that of the gestalt of implementation of the above 1st. Moreover, like the gestalt of implementation of the above 1st, after magnetization of a recording layer records BCA, it may be performed. Furthermore, when carrying out temperature up of the recording layer and magnetizing it using stroboscope light etc., even if it is the 5K oersted which is a field smaller than the case where it magnetizes at a room temperature, the sense of magnetization of a recording layer can be arranged with an one direction.
[0089] Although the recording layer in the gestalt of this operation is a three-tiered structure which consists of the playback magnetic film 233, a medium magnetic film 234, and a record magnetic film 235, it can record identification information by reducing remarkably the magnetic anisotropy of a direction vertical to the film surface of the part which heat-treated the record magnetic film 235 at least, and making it into a property with the almost dominant magnetic anisotropy of field inboard.
[0090] Here, by addition of the various elements with which selection of a presentation differs from the magnitude of a vertical magnetic anisotropy, since Curie temperature, coercive force, etc. of a magnetic film which constitute a recording layer can be changed comparatively easily, they can set up the production conditions of the recording layer of a magneto-optic disk, and the record conditions of identification information the optimal according to the record playback conditions required of a magneto-optic disk.
[0091] In addition, in the gestalt of the above 1st and the 2nd implementation, although the TbFeCo film, the GdFeCo film, and the TbFe film are used as an SiN film and a magnetic film as polycarbonate resin and dielectric layers 212, 214, 232, and 236 as disk substrates 211 and 231, respectively As disk substrates 211 and 231, glass or polyolefine, The film of the nitride of others [can use plastics, such as PMMA, and] as dielectric layers 212, 214, 232, and 236, such as AlN, Or the film of chalcogen ghosts, such as film

of the oxide of TaO2 grade, or ZnS, Or the film of the mixture using these two or more kinds can be used, and the magnetic material which has the vertical magnetic anisotropy of the rare earth metal-transition-metals system ferrimagnetism film with which an ingredient differs from a presentation as a magnetic film or MnBi, PtCo, etc. and others can be used.

[0092] Moreover, in the gestalt of implementation of the above 2nd, although the vertical magnetic anisotropy of the record magnetic film 235 of the recording layer of a three-tiered structure is degraded, even if it is the case where the vertical magnetic anisotropy of all the magnetic films of the vertical magnetic anisotropy of at least one magnetic film or the playback magnetic film 233, the medium magnetic film 234, and the record magnetic film 235 is degraded among the playback magnetic film 233 and the record magnetic film 235, the same effectiveness is acquired.

[0093] <Gestalt of the 3rd operation> Drawing 40 is the sectional view showing the configuration of the optical disk in the gestalt of operation of the 3rd of this invention. As shown in drawing 40 , on the disk substrate 301, the recording layer 303 which consists of a phase change ingredient which may change between a crystal phase and amorphous phases reversibly through a dielectric layer 302 is formed. Two or more BCA sections 310 are recorded on the disk circumferencial direction by the recording layer 303. On the recording layer 303, the laminating of the medium dielectric layer 304 and the reflecting layer 305 is carried out one by one, and the overcoat layer 306 is further formed on it. And the disk of two sheets with which only the 1st optical disk has the overcoat layer 306 is stuck by the glue line 307. In addition, you may be the configuration that the optical disk of two sheets of the same configuration was stuck by the hot melt method.

[0094] Next, the manufacture approach of the optical disk in the gestalt of this operation is explained. First, the disk substrate 301 with which the guide rail or pre pit for a tracking guide was formed is produced by the injection-molding method using poly car baud NETO resin. Subsequently, it is ZnSSiO2 in Ar gas ambient atmosphere. By performing high frequency (RF) sputtering to a target, the dielectric layer 302 of 80nm of thickness which consists of ZnSSiO2 film is formed on the disk substrate 301. Subsequently, the recording layer 303 of 20nm of thickness which consists of a GeSbTe alloy is formed on a dielectric layer 302 by performing RF sputtering to a GeSbTe alloy target in Ar gas ambient atmosphere. Subsequently, it is ZnSSiO2 in Ar gas ambient atmosphere. By performing RF sputtering to a target, it is ZnSSiO2 on a recording layer 303. The medium dielectric layer 304 of 60nm of thickness which consists of film is formed. Subsequently, the reflecting layer 305 of 40nm of thickness which consists of AlCr film is formed on the medium dielectric layer 304 by performing DC sputtering to an AlCr target in Ar gas ambient atmosphere. Subsequently, after ultraviolet-rays hardening resin is dropped on a reflecting layer 305, the overcoat layer 306 of 5 micrometers of thickness is formed on a reflecting layer 305 by applying said ultraviolet-rays hardening resin at the rotational frequency of 3500rpm, irradiating ultraviolet rays, and stiffening said ultraviolet-rays hardening resin by the spin coater. Thereby, the 1st optical disk is obtained. On the other hand, the 2nd optical disk is produced, without forming an overcoat layer. Finally, by the hot melt method, adhesives are stiffened, a glue line 307 is formed and the 1st optical disk and 2nd optical disk are stuck.

[0095] Here, record of the information on the recording layer 303 which consists of a germanium-Sb-Te alloy is performed in the exposure section by irradiating the laser

beam narrowed down to the minute spot using the difference in the optical property based on a reversible structural change on the atomic level between that a local change arises, i.e., a crystal phase, and an amorphous phase arising. Moreover, the recorded information is reproduced by detecting the difference of the amount of reflected lights to specific wavelength, or the amount of transmitted lights.

[0096] The optical disk equipped with the recording layer which consists between two detectable conditions of the above thin films which may change reversibly optically is high-density, and is applied to DVD-RAM etc. as a rewritable commutative medium.

[0097] The record approach of the identification information (postscript information) in the gestalt of this operation is the same as that of the case of the gestalt of the above 1st and the 2nd implementation almost. That is, using high power laser, such as an YAG laser, and a 1 direction-focusing lens like a cylindrical lens, the laser beam of a rectangular stripe configuration is completed on a recording layer 303, and two or more BCA sections 310 are recorded on a disk circumferencial direction. If the laser beam of high power is irradiated by the recording layer 303 rather than the time of the main information record, the structural change by excessive crystallization by phase transition will produce the optical disk of the gestalt of this operation. For this reason, it becomes possible to record the BCA section 310 irreversible. In this case, as for the BCA section 310, being recorded as an irreversible condition of a crystal phase is desirable. And since the amount of reflected lights from the part on which identification information was recorded by doing in this way and recording the BCA section (identification information) 310, and the amount of reflected lights from other parts change, identification information is reproducible like the gestalt of implementation of the above 1st with an optical head. In this case, as for fluctuation of the amount of reflected lights from an optical disk, it is desirable that it is 10% or more, and it can set up fluctuation of the amount of reflected lights to 10% or more by making change of an average refractive index into 5% or more. Moreover, in the case of DVD-RAM, by making a part of protective layer or reflecting layer suffer a loss as well as DVD-ROM, fluctuation of the amount of reflected lights can become beyond a predetermined value, and it not only produces an excessive structural change of a recording layer, but it becomes reproducible [a BCA signal]. Moreover, since it is lamination structure, it is satisfactory also in dependability.

[0098] Next, the recording device and the record approach of identification information (postscript information) in this invention are further explained to a detail, referring to a drawing. Here, in order to use identification information as the record regenerative apparatus of the disk for DVD at common use, it explains the detail of the technical content using a format of the recording method of the identification information of DVD, and a record signal, and omits explanation about the regenerative-signal pattern of a magneto-optic disk. However, in high density magneto-optic disks, such as ASMO, since playback of identification information is performed using the optical head 255 of a configuration of being shown in drawing 7 , the detection approach of a record signal differs from playback conditions.

[0099] The block diagram and drawing 16 which show a laser recorder [in / in drawing 15 / the gestalt of operation of this invention] are drawing showing the signal wave form and trimming configuration of a case of "RZ record" in the gestalt of operation of this invention. As shown in drawing 16 (1), in this invention, RZ record is used as a recording

method of identification information. In RZ record Time-slot, for example, 1st time slot, 920a of plurality [time amount / one / unit], Are divided into 2nd time-slot 921a, 3rd time-slot 922a, etc., and when data are "00" As shown in drawing 16 (1), pulse 924a of time amount width of face narrower (between t=t1 and t=t2) than the period T of a time slot, i.e., the period of a channel clock, is recorded on 1st time-slot 920a. In this case, if generate a clock in the clock signal generating section 913, it is made to synchronize with this and it records by the revolution pulse of revolution sensor 915a of the motor 915 as shown in drawing 15 , the effect of the revolution nonuniformity of a motor 915 can be lost. As shown in drawing 16 (2), on a disk, trimming of the stripe 923a which shows "00" in 1st record section 925a of the four record sections is carried out by laser.
[0100] When data are "01", as shown in drawing 16 (3), pulse 924b of time amount width of face narrower (between t=t2 and t=t3) than the period T of a time slot, i.e., the period of a channel clock, is recorded on 2nd time-slot 921b. As shown in drawing 16 (4), on a disk, trimming of the stripe 923b which shows "01" in 2nd record section 926b of the four record sections is carried out by laser.
[0101] When data are "10" and "11", it is recorded on 3rd time-slot 922a and the 4th time slot, respectively. A circular bar code as shown in drawing 39 (1) as mentioned above is recorded on a disk.
[0102] Here, "NRZ record" used by the conventional bar code record is explained. In NRZ record, the pulse of the same time amount width of face as the period T of a time slot, i.e., the period of a channel clock, is recorded. In RZ record of this invention, T (1/n) is enough as the time amount width of face of one pulse, but in NRZ record, when the time amount width of face T large as time amount width of face of a pulse is needed and T continues further, one twice and 3 times the time amount width of face 2T and 3T of this is needed as time amount width of face of a pulse. Since it is necessary to change the configuration of equipment itself into changing the line breadth of laser trimming in the case of laser trimming like this invention, it is actually difficult and is not suitable for NRZ record. Therefore, in the case of the data of "00", the stripe of the time amount width of face T is formed in the 1st and the 3rd record section from the left, and when it is data of "10", the stripe of time amount width-of-face 2T is formed in the 2nd and the 3rd record section from the left.
[0103] Since pulse width is 1T and 2T in the conventional NRZ record, it turns out that laser trimming of this invention is not suitable. The stripe (bar code) recorded by laser trimming of this invention is difficult to change the line breadth of trimming for every optical disk, and to control to a precision, although it is reproduced as shown in drawing of the experimental result of drawing 6 (a) or drawing 31 (1). When trimming the reflective film or recording layer of an optical disk, it is because the line breadth of trimming is changed by fluctuation of the thickness of output fluctuation of a pulse laser, and the reflective film, and the heat conductivity of construction material and a disk substrate and thickness. Moreover, when the bar code from which line breadth differs is prepared on the same disk, the configuration of a recording device becomes complicated. For example, in the NRZ record used by the goods bar code, it is necessary to double the line breadth of trimming with accuracy periodic 1T of a channel clock, or 2T and 3T, i.e., nT. Especially the thing for which the line breadth of the varieties of 2T and 3T grade is changed for every Bar, and is recorded is difficult. Since a format of the conventional goods bar code is NRZ, when it applies to the laser bar code of this invention, it is

difficult to record the line breadth from which 2T and 3T grade differ on accuracy on the same disk, and the yield falls. Moreover, since the line breadth of laser trimming is changed, it cannot stabilize and record but a recovery also becomes difficult. Even if it changes the line breadth of laser trimming by considering as RZ record like this invention, it is stabilized and digital storage can be performed. Moreover, since the line breadth of laser trimming requires only one kind in RZ record, it is not necessary to modulate laser power and the configuration of a recording device becomes easy.

[0104] As mentioned above, in the case of the laser bar code for the optical disks of this invention, by combining RZ record, it is stabilized and digital storage can be performed. Next, the case where PE modulation of the RZ record is carried out is explained. Drawing 17 is drawing showing the signal wave form and trimming configuration at the time of carrying out PE modulation of the RZ record of drawing 16 . When data are "0", as shown in drawing 17 (1), first, two time-slots 920a, To time-slot 920a of the left-hand side of the 921a (between t=t1 and t=t2) Pulse 924a of time amount width of face narrower than the period T of a time slot, i.e., the period of a channel clock, is recorded, and when data are "1" As shown in drawing 17 (3), pulse 924b of time amount width of face narrower (between t=t2 and t=t3) than the period T of a time slot, i.e., the period of a channel clock, is recorded on time-slot 921b of the right-hand side of the two time slots 920b and 921b. On a disk, as shown in drawing 17 (2) and (4), trimming of the stripe 923b stripe 923a which shows "0" in left-hand side record section 925a indicates "1" to be in right-hand side record section 926b is carried out by laser, respectively. In this way, when data are "010", as shown in drawing 17 (5), on left-hand side, i.e., the time slot of "0", pulse 924d is recorded on right-hand side, i.e., the time slot of "1", pulse 924e is recorded for pulse 924c by left-hand side, i.e., the time slot of "0", respectively, and trimming of the stripe is carried out by laser on a disk in the record section of the left-hand side of the two record sections, right-hand side, and left-hand side. The signal which carried out PE modulation of the data of "010" is shown in drawing 17 (5). As shown in drawing 17 (5), a signal surely exists in each channel bit. That is, the signal consistency is always fixed and is DC free-lancer. Thus, since it is DC free-lancer, even if PE modulation detects a pulse edge at the time of playback, it is strong to fluctuation of a low-frequency component. Therefore, the demodulator circuit of the disk regenerative apparatus at the time of playback becomes easy. Moreover, since one pulse 924 surely exists in every channel clock 2T, even if it does not use PLL, the synchronous clock of a channel clock is reproducible.

[0105] A circular bar code as shown in drawing 39 (1) as mentioned above is recorded on a disk. When recording the data "01000" of drawing 39 (4), in PE-RZ record of the gestalt of this operation, the bar code 923 of the same pattern as the record signal 924 of drawing 39 (3) is recorded like drawing 39 (2). When this bar code is reproduced by the optical pickup of a regenerative apparatus, a wave-like regenerative signal since a reflective signal is lost at a part of pit modulating signal, as shown in drawing 39 (5) by the reflecting layer lack section of a bar code is acquired. The wave-like signal after filtering as shown in drawing 39 (6) is acquired by letting the secondary CHIEBIHOFU mold [3rd] LPF 943 as shows this regenerative signal to drawing 23 (a) pass. By slicing this signal using a level slicer, the playback data "01000" of drawing 39 (7) get over.

[0106] As explained using drawing 11 (a) and (b), when laser-trimming record is performed to the magneto-optic disk of veneer structure by excessive power, an overcoat

layer (protective layer) will be destroyed. Therefore, after performing laser-trimming record by excessive power, it is necessary to form a protective layer again at works. For this reason, bar code record can be performed neither in a software firm nor a dealer, but it is expected that an application is limited greatly. Moreover, dependability may also pose a problem.

[0107] In the case of the magneto-optic disk of veneer structure, only a recording layer is heat-treated, and if laser-trimming record is performed by changing the magnetic anisotropy of a film surface perpendicular direction, postscript information can be recorded, without destroying an overcoat layer (protective layer). In this case, it was changeless to magnetic properties after the environmental test of 85 temperature and 95% of humidity for 96 hours.

[0108] On the other hand, when laser-trimming record of this invention was applied to the lamination disk which stuck the optical disk of two sheets using a transparence substrate, it checked remaining without destroying a protective layer by experimenting and observing with a 800 times as many optical microscope as this. Moreover, it was changeless on the reflective film of the trimming section after the environmental test of 85 temperature and 95% of humidity like the magneto-optic disk for 96 hours. Thus, since it is not necessary to form a protective layer again at works by applying laser-trimming record of this invention to a lamination disk like DVD, laser-trimming record of a bar code can be performed in for example, the software firms and dealers other than press works. For this reason, since it becomes unnecessary to take out the information on the private key of the code of a software firm to external, when recording security information, for example, the serial number for anti-copying, on a bar code, security improves greatly. Moreover, since a bar code is separable with the pit signal of DVD by setting the line breadth of trimming or more to 14T, i.e., 1.82 micrometers, in the case of DVD so that it may mention later, it can superimpose on the pit record section of DVD, and a bar code can be recorded. Thus, by applying the trimming approach of this invention, and the modulation record approach to a lamination disk like DVD, secondary record can be performed after factory shipments. Also in the case of a magneto-optic disk, secondary record can be performed by the same record approach.

[0109] Below, actuation of the laser recorder shown in drawing 15 is explained. An interleave is applied, while the ID number and input data which were published in the serial number generating section 908 are first compounded within the input section 909, signature or encryption is performed by the code encoder 830 using code functions, such as a RSA function and a DES function, if needed and error correction coding is performed by the ECC encoder 907, as shown in drawing 15 . Subsequently, a PE-RZ modulation is performed in the PE-RZ modulation section 910. The modulation clock in this case is made from the clock signal generating section 913 synchronizing with the revolution pulse from a motor 915 or revolution sensor 915a. Subsequently, based on a PE-RZ modulating signal, a trigger pulse is made in the laser luminescence circuit 911, and this trigger pulse is inputted into the high power laser 912, such as an YAG laser established by the laser power circuit 929. Thereby, pulse-like laser emits light, image formation is carried out on the recording layer 235 of the magneto-optic disk 240 of the veneer, the recording layer 303 of the lamination disk 300, or the reflective film 802 of the lamination disk 800, in the shape of a bar code, it is degradation-recorded or recording layers 235 and 303 or the reflective film 802 is removed by the condensing

section 914. An error correction method is explained to a detail later. The method which signs as a cipher system with the private key in which a software firm has public key encryption as a serial number is taken. In this case, since no persons other than a software firm can have a private key and cannot sign a new serial number, they can prevent issuance of the serial number of illegal contractors other than a software firm. Moreover, since reverse decode of the public key cannot be carried out in this case, safety is high. For this reason, forgery can be prevented even if it is the case where recorded the public key on the disk and it is transmitted to a playback machine side. With means, such as reading a reflection factor and disk type identification information for a magneto-optic disk 240, and DVD-RAM300 and the DVD-ROM disk 800, it distinguishes in the disk distinction section 260, and in the case of a magneto-optic disk 240, record power is lowered, or out of focus of the focus is carried out to it. Thereby, it is stabilized in a magneto-optic disk 240, and BCA can be recorded.

[0110] Here, the condensing section 914 of a laser recorder is explained to a detail, referring to drawing 18 . As shown in drawing 18 (a), incidence of the light from laser 912 is carried out to the condensing section 914, and it turns into parallel light by collimator 912a, by the cylindrical lens 917, converges only on the one direction of the circumferencial direction of an optical disk, and turns into light of the shape of a long stripe radially. After this light is cut with a mask 918, image formation is carried out with a focusing lens 919 on the recording layer 235 of a magneto-optic disk 240, the recording layer 303 of DVD-RAM300, or the reflective film 802 of the DVD-ROM disk 800, in the shape of a stripe, it is degradation-recorded or recording layers 235 and 303 or the reflective film 802 is removed. In this case, the mask 918 has restricted the four directions of a stripe. However, what is necessary is just to restrict the one direction of the periphery side of the longitudinal direction of a stripe actually. In this way, the stripe 923 as shown in drawing 18 (b) is recorded on a disk. In PE modulation, as spacing of a stripe, three sorts, 1T, 2T, and 3T, exist, but if this spacing shifts, a jitter will occur and an error rate will go up. since the clock generation section 913 generates a record clock and sends to the modulation section 910 in this invention synchronizing with the revolution pulse of a motor 915 -- a motor 915 240, i.e., optical MAG DISUTA, DVD-RAM300, and the DVD-ROM disk 800 -- according to each revolution, a stripe 923 is recorded on an exact location. For this reason, a jitter is reduced. In addition, by establishing the scanning means of laser, continuous wave laser can be scanned radially and a bar code can also be formed.

[0111] Here, the description of a format is explained, referring to drawing 19 . As shown in drawing 19 , in the case of the DVD disk, all data are recorded by CLV. However, the stripe 923 of this invention is superimposed on the PURIPITTO signal of the lead-in groove data area where address information was recorded by CLV, and is recorded by CAV (overwrite). Thus, CLV data are recorded with the pit pattern of original recording, and CAV data are recorded by making the reflective film missing with laser. Among 1T, 2T, and 3T of a bar code-like stripe, since it is overwrite, the pit is recorded. By using the information on this pit, the tracking of an optical head becomes possible and it is Tmax of a pit signal. Or Tmin Since it is detectable, this signal can be detected and rotational-speed control of a motor can be applied. It will be Tmin if the trimming width of face t of a stripe and the clock T of a pit (pit) fill the relation of t>14T (pit). It can detect, this signal can be detected and rotational-speed control of a motor can be applied. Since t

cannot become the same pulse width and cannot discriminate from stripe 923a and a pit when shorter than 14T (pit), it becomes impossible to get over. Moreover, since pit information has prepared the one or more die length of the address field 944 in order to read the address information of a pit in the same radius location as a stripe, address information is obtained and a track jump becomes possible. Moreover, since a substantial reflection factor only falls by 6dB by setting to 50% or less of T(S) <T (NS), the ratio, i.e., the duty ratio, of a stripe and a non-stripe, as shown in drawing 24 , the focus of an optical head is being stabilized [come]. Although there is also a model which cannot perform tracking control depending on a player by existence of a stripe, since a stripe 923 is CAV data, if the CAV revolution of the actuation is applied and carried out using the revolution pulse from the hall device of a motor 17 etc., it is reproducible with an optical pickup.

[0112] In addition, since the range of fluctuation of a reflection factor becomes 10% or less in the case of a magneto-optic disk, there is no effect in focal control. The flow chart of operations sequence in case the pit data of an optical truck are not normally reproduced in a stripe field by drawing 20 is shown. If an optical disk is inserted (step 930a), first, an optical head will move to the inner circumference section of an optical disk (step 930b), and the field of the stripe 923 shown in drawing 19 will be arrived at. In this field, since those all may not be reproduced normally, the pit signal of the field of a stripe 923 cannot apply the revolution phase control which is performed in the case of CLV. For this reason, Tmax of the revolution sensor of the hall device of a motor, or a pit signal Or Tmin Rotational-speed control is applied by measuring a frequency (step 930c). Subsequently, when it is distinguished whether there is any stripe (step 930i) and there is no stripe, an optical head moves to the periphery section of an optical disk (step 930f). When there is a stripe, a stripe (bar code) is reproduced (step 930d). Subsequently, when it is distinguished whether playback of a bar code was completed (step 930e) and playback of a bar code is completed, an optical head moves to the periphery section of an optical disk (step 930f). Since a stripe does not exist in this field, a pit signal is reproduced thoroughly and a focus and a tracking servo start normally. Moreover, since a pit signal is reproduced thoroughly in this way, the usual revolution phase control becomes possible (step 930g), and it becomes a CLV revolution. For this reason, a pit signal is normally reproduced by step 930h.

[0113] Thus, two kinds of data with which the data of a stripe (bar code) differ from the data by which pit record was carried out are reproducible by changing two roll controls, rotational-speed control and the revolution phase control by the pit signal. In this case, since a stripe (bar code) is in the most-inner-circumference section of an optical disk, two roll controls, rotational-speed control and revolution phase control, can be certainly changed by measuring the disk radial location of an optical head using the stopper of an optical head, or the address information of a pit signal.

[0114] Here, the format suitable for high-speed switch record is explained using the data configuration of the synchronous sign of drawing 22 . The fixed pattern of drawing 22 (a) is "01000110." As a fixed pattern, although "01000111" etc. of the number with 0 and 1 is usually common, by this invention, it is daring make it this data configuration. [same] The reason is explained. In order to perform high-speed switch record, two or more pulses are bad in close to 1t first. As shown in drawing 21 (a), since a data area is PE-RZ record, high-speed switch record is possible for it. However, since the synchronous sign

of drawing 22 (a) is arranged as an irregular channel bit, by the usual approach, two pulses may exist in 1t and it cannot perform high-speed switch record in this case. In this invention, as shown in "01000110", it is carried out, for example. therefore, it is shown in drawing 22 (b) -- as -- T1 **** -- one right pulse and T2 **** -- zero pulse and T3 **** -- one right pulse and T four **** -- it becomes one left pulse and a pulse does not become two pieces by each time slot For this reason, by adopting the synchronous sign of this invention, high-speed switch record can be attained and a production rate can be raised twice.

[0115] Next, a record regenerative apparatus is explained. Drawing 14 is the block diagram of a record regenerative apparatus. Here, it extracts and explains to a recovery. As for the signal output of a stripe, the high frequency component by the pit is first removed by LPF943. In the case of DVD, the T= 0.13-micrometer signal of a maximum of 14 T may be reproduced. In this case, it was checked by experiment by letting LPF943 of the secondary CHIEBIHOFU mold [3rd] as shown in drawing 23 (a) pass that the high frequency component by the pit is removable. That is, if secondary more than LPF is used, a pit signal and a bar code signal are separable, it is stabilized and a bar code can be reproduced. The simulation wave in the case of being the worst is shown in drawing 23 (b).

[0116] As mentioned above, since a pit regenerative signal can be removed mostly and a stripe regenerative signal can be outputted by using secondary more than LPF943, it can restore to a stripe signal certainly.

[0117] Again, it returns and explains to drawing 14 . Digital data gets over in PE-RZ recovery section 930a, and the error correction of this data is carried out in ECC decoder 930b. And an interleave is canceled in 930d of day interleave sections, the operation of a Reed Solomon code is made towards RS decoder 930c, and an error correction is performed. In this invention, as shown in the data configuration of drawing 21 (a), an interleave and the Lead Solomon error correction coding are made using the ECC encoder 907, as shown in drawing 15 at the time of record. Therefore, it is a disk 107, if the cutting tool error rate before correction is 10-4 as by taking this data configuration shows to drawing 21 (c). Only the error of one sheet is generated in **. It is one Sync per four synchronous signs in order to make the data length of Code small as this data configuration, as shown in drawing 22 (a). By taking the configuration which attached Code, it becomes one fourth of the classes of SyncCode, and effectiveness increases.

[0118] Here, the scalability of a data configuration is explained, referring to drawing 22 . Arbitration can be made to fluctuate storage capacity per 16B in the range of 12B to 188B in this invention, as shown in drawing 22 (c). As shown in drawing 21 (a), it can change from n= 1 to n= 12. For example, as shown in drawing 21 (b), in the case of n= 1, a data line only has 951a, 951b, 951c, and 951d of four lines, and, next, it becomes the ECC lines 952a, 952b, 952c, and 952d. 951d of data lines is set to 4b of EDC. And to the data line from 951e to 951z, all data of 0 consider that close is what is, and the operation of an error correction sign is performed. Encoding of such ECC is performed by the ECC encoder 907 of the laser recorder of drawing 15 , and is recorded on a disk as a bar code. In the case of n= 1, the data of 12b are recordable in the include-angle range of 51 degrees on a disk. Similarly, in the case of n= 2, the data of 18b are recordable, and when it is n= 12, the data of 271b can be recorded on the include-angle range of 336 degrees on a disk.

[0119] In the case of this invention, this scalability is meaningful. Moreover, in the case of laser trimming, a production baton becomes important. In order to trim [every], with low-speed equipment, 10 seconds or more are needed for recording thousands of [of maximum capacity]. Since the production baton of a disk is 4 seconds, the baton of production will fall. On the other hand, a disk ID number serves as a subject and the application of this invention is good about 10b at the beginning. Since the floor to floor time of do [10b writing / 271b records of] of laser increases by 6 times, a production cost goes up. By using the scalability method of this invention, a production cost and time amount are reducible.
[0120] In addition, in the interior of ECC decoder 930b of the record regenerative apparatus shown in drawing 14 , the error correction of the data of 12b to 271b can be carried out by the same program by considering that all close data of 0 are in the data line from 951e to 951z in the case of n= 1 shown in drawing 21 (b), and performing the error correction operation of ECC.
[0121] As shown in drawing 24 , in the case of 1T, pulse width becomes 4.4 microseconds and abbreviation 1/2 to 8.92 microseconds of stripe spacing. Moreover, since pulse width is 4.4 microseconds, if pulse width takes [as opposed to / the case of 2T / 17.84 microseconds of stripe spacing / as opposed to / 4.4 microseconds and the case of 3T / 26.76 microseconds of stripe spacing] an average in a PE-RZ modulation, 3 [about 1-/] will become a pulse part (a reflection factor is about 0). Therefore, by the disk of 70% of standard reflection factors, a reflection factor becomes about 2/3, i.e., about 50%, and can also reproduce a general ROM disk player.
[0122] Moreover, in the case of a magneto-optic disk, the average refractive index of a recording layer does not change, but since fluctuation of average reflectance is also 10% or less, the level variation of a playback wave is small and the transposition to a DVD player is also easy level variation.
[0123] Next, a playback procedure is explained using the flow chart of drawing 25 . Insertion of a disk reproduces TOC (Control Data) first (step 940a). As shown in drawing 19 , in the optical disk of this invention, the stripe existence identifier 937 is recorded on TOC of the TOC field 936 by the pit signal. For this reason, when TOC is reproduced, it is turned out whether the stripe is recorded or not. Subsequently, 0 or 1 is distinguished for the stripe existence identifier 937 (step 940b). When the stripe existence identifier 937 is 0, an optical head moves to the periphery section of an optical disk, it changes to revolution phase control, and the usual CLV playback is performed (step 940f). When the stripe existence identifier 937 is 1, it is distinguished whether the stripe is recorded on a playback side and the field of reverse, i.e., a rear face, (step 940h). (is the rear-face existence identifier 948 1 or 0?) When the rear-face existence identifier 948 is 1, the recording layer of the rear face of an optical disk is reproduced (step 940i). In addition, when the rear face of an optical disk is automatically unreproducible, rear-face playback directions are outputted and displayed. When it turns out that the stripe is recorded on the field under playback by step 940h, it moves to the field of the stripe 923 of the inner circumference section of an optical disk (step 940c), and an optical head changes to rotational-speed control, carries out a CAV revolution, and reproduces a stripe 923 (step 940d). Subsequently, when it is distinguished whether playback of a stripe 923 was completed (step 940e) and playback of a stripe 923 is completed, an optical head moves to the periphery section of an optical disk, it changes to revolution phase control again,

the usual CLV playback is performed (step 940f), and the data of a pit signal are reproduced (step 940g).

[0124] Thus, a stripe 923 is certainly reproducible by recording the stripe existence identifier 937 on pit fields, such as TOC. Since tracking does not start in the field of a stripe 923 in being the optical disk with which the stripe existence identifier 937 is not defined, distinction with a stripe 923 and a blemish takes time amount. That is, even when there is no stripe, in order to go to reading, a stripe will have to be checked at the step of what does not have a stripe really, being in inner circumference further, and excessive time amount will surely cut it in a standup. Moreover, since the stripe rear-face existence identifier 948 is recorded, it turns out that the stripe 923 is recorded on the rear face. For this reason, even if it is the case of optical disks, such as DVD of a double-sided mold, the stripe 923 of a bar code is certainly reproducible. Since the stripe of this invention penetrates the reflective film of both double-sided disks in the case of DVD-ROM, it can read also from a rear face. It is reproducible also from a rear face by seeing the stripe rear-face existence identifier 948, making it the sign of reverse and reproducing at the time of playback of a stripe 923. In this invention, as shown in drawing 22 (a), "01000110" is used as a synchronous sign. Therefore, if it reproduces from a rear face, the synchronous sign of "01100010" will be detected. For this reason, it is detectable to reproduce the stripe 923 of a bar code from a rear face. In this case, in the record regenerative apparatus of drawing 14 , when the 2nd recovery section 930 restores to a sign conversely, even if it plays a double-sided disk from a rear face, the stripe 923 of the penetrated bar code is normally reproducible. Moreover, as shown in drawing 19 , the postscript stripe data existence identifier 939 and stripe storage capacity are recorded on TOC. Therefore, when the stripe 923 of the 1st trimming is already recorded, it can calculate which capacity can record the stripe 938 of the 2nd trimming. For this reason, when the recording device of drawing 15 performs 2nd trimming with TOC data, it can distinguish which is recordable. Consequently, it can prevent recording 360 degrees or more too much, and destroying the stripe 923 of the 1st trimming. In addition, as shown in drawing 19 , it can prevent destroying front trimming data by forming the null section 949 of one or more pit signals between the stripe 923 of the 1st trimming, and the stripe 938 of the 2nd trimming.

[0125] Moreover, since the count identifier 947 of trimming is recorded on synchronous sign part as shown in drawing 22 (b), the data of the stripe 923 of the 1st trimming and the stripe 938 of the 2nd trimming are discriminable. If this count identifier 947 of trimming does not exist, the 1st stripe 923 of drawing 19 and the 2nd stripe 938 can be distinguished.

[0126] Next, the procedure from contents to disk production is explained using drawing 33 . As shown in drawing 33 , in the disk manufacture department 19, first, with the MPEG encoder 4, variable length coding of the contents 3 of original copies, such as a film, is blocked and carried out, and they serve as compression video signals, such as MPEG by which picture compression was carried out. As for this signal, a scramble is applied with the code encoder 14 using the business-use cryptographic key 20. This scrambled compression video signal is recorded as a pit-like signal on original recording 6 by the original recording production machine 5. By this original recording 6 and making machine 7, the disk substrate 8 of a large quantity with which the pit was recorded is manufactured, and reflective film, such as aluminum, is formed by the

reflecting layer molding machine 15. Lamination and the lamination disk 10 are completed for two disk substrates 8 and 8a with the lamination machine 9. Moreover, in the case of a magneto-optic disk, the above-mentioned compression video signal is recorded by the recording layer as an optical MAG signal. Moreover, in the case of veneer structure, disk 240a is completed without lamination. Moreover, in the case of DVD-RAM, similarly, the above-mentioned compression video signal is recorded on a recording layer, two disk substrates are stuck by the lamination machine 9, and the lamination disk 300 is completed. Two kinds of disk configurations, the single type which has a recording layer only on one side in DVD-RAM, and the double type which has a recording layer to both sides, are possible.

[0127] Next, actuation of the level slice of BCA is explained using drawing 38 and drawing 39 . As shown in drawing 38 (1), in the BCA record by laser, the laser light from a pulse laser 808 is irradiated at the aluminum reflective film 809 of the lamination disk 800, and the low reflective stripe-like section 810 is recorded by trimming the aluminum reflective film 809 based on PE modulating signal. Thereby, as shown in drawing 38 (2), the stripe of BCA is formed on a disk. If this stripe of BCA is reproduced with the usual optical head, since the reflective signal from the BCA section will be lost, as shown in drawing 38 (3), the lack signal sections 810a, 810b, and 810c which lacked the modulating signal intermittently occur. The modulating signal of eight to 16 modulation of a pit is sliced with the 1st slice level 915, and the main signal restores to it. On the other hand, since signal level is low, lack signal section 810a etc. is easily sliceable with the 2nd slice level 916. The bar codes 923a and 923b shown in drawing 39 (2) are the 2nd slice level S2 shown in drawing 39 (5). By carrying out a level slice, it is reproducible by the usual optical pickup. As shown in drawing 39 (6), the pit signal of high frequency is the 2nd slice level S2 about a repressed signal at LPF. A binary-ized signal is acquired by slicing. And a digital signal as shown in drawing 39 (7) is outputted by carrying out the PE-RZ recovery of this binary-ized signal. The situation of a actual regenerative signal becomes like drawing 31 .

[0128] Next, recovery actuation is explained using drawing 14 . As shown in drawing 14 , the disk 800 with BCA serves as the configuration that two transparence substrates were stuck so that recording layer 802a may come to inside, and may be two-layer [of the case where recording layer 802a is one layer, and recording layers 802a and 802b]. When a recording layer is two-layer, the stripe existence identifier 937 (refer to drawing 19) which shows whether BCA exists in CDC of 1st recording layer 802a near the optical head 255 is recorded. In this case, since BCA exists in 2nd recording layer 802b, first, a focus is doubled with 1st layer recording layer 802a, and the optical head 255 is moved to the radius location of CDC which exists in the most inner circumference of the 2nd record section 919. since CDC is the main information -- EFM or 8-15 -- or it becomes irregular eight to 16 times. Only when the stripe existence identifier 937 in this CDC is '1', in one layer and the two-layer section change-over section 827, a focus is doubled with 2nd recording layer 802b, and BCA is reproduced. It will be changed into a digital signal if it slices using the 1st level slicer 590 with the 1st general slice level 915 as shown in drawing 38 (3). It gets over in the EFM recovery section 925, the 8-15 modulation recovery section 926, or the 8-16 modulation recovery section 927 in the 1st recovery section 928, and by the ECC decoder 36, the error correction of this signal is carried out, and it is outputted as main information. CDC in this main information is reproduced, and

only when the stripe existence identifier 937 is '1', it goes BCA to reading. When the stripe existence identifier 937 is '1', CPU923 takes out directions to one layer and the two-layer section change-over section 827, drives the focal controller 828, and changes a focus from the 1st recording layer 802a to 2nd recording layer 802b. Simultaneously, the optical head 255 is moved to the radius location (BCA which is recorded from 22.3 to 23.5mm by the side of the inner circumference of CDC in the case of DVD specification) of the 2nd record section 920, and BCA is read. In a BCA field, the signal with which the envelope as shown in drawing 38 (3) was selectively missing is reproduced. By setting up the 2nd slice level 916 of the quantity of light lower than the 1st slice level 915 in the 2nd level slice section 929, the reflective section lack section of BCA is detected and a digital signal is outputted. It gets over by PE-RZ recovery section 930a of the 2nd recovery section 930, ECC decoding is carried out by ECC decoder 930b, and this signal is outputted as BCA data which are subinformation. Thus, recovery playback of the main information is carried out in the 1st recovery section 928, and recovery playback of the BCA data which are subinformation in the 2nd recovery section 930 is carried out. The simulation wave after passing the processing dimensional accuracy of the slit of the low reflective section 810 to the playback wave before passing LPF943 to drawing 24 (a), and drawing 24 (b) and passing LPF943 to drawing 23 (b) is shown. It is difficult to set width of face of a slit to 5-15 micrometers or less. Moreover, record data will be destroyed if it does not record on inner circumference rather than 23.5mm. In the case of DVD, the maximum capacity after a format is limited to 188 or less byteses from a limit of the shortest record period =30micrometer and maximum-radius =23.5mm.

[0129] Here, it explains in detail and concretely about the setting-out approach of the 2nd slice level 916 explained using drawing 14 , and actuation of the 2nd level slice section 929. The detail drawing of only the 2nd level slice section 929 is shown in drawing 26 . Moreover, a wave form chart required for this explanation is shown in drawing 27 .

[0130] As shown in drawing 26 , the 2nd level slice section 929 is constituted by 587d of two counting-down circuits which carry out dividing of the quantity of light reference-value setting-out section 588 which supplies the 2nd slice level 916, and the output signal of the 2nd level slicer 587 to the 2nd level slicer 587. Moreover, the quantity of light reference-value setting-out section 588 is constituted by LPF588a and level-conversion section 588b.

[0131] Hereafter, actuation is explained. In a BCA field, the signal which lacked selectively the envelope as shown in drawing 27 (1) by existence of BCA is reproduced. The high frequency component by the pit signal and the low-frequency component by the BCA signal are mixed by this regenerative signal. However, the RF signal component of 8 -16 modulation is oppressed by LPF943, and the low frequency signal 932 of only a BCA signal as shown in drawing 27 (2) is inputted into the 2nd level slice section 929.

[0132] If the low frequency signal 932 is inputted into the 2nd level slice section 929, a time constant is larger than LPF943, that is, the quantity of light reference-value setting-out section 588 will be level-conversion section 588b, will be adjusted [will be LPF588a which can extract the component of low frequency more, and the pan of the low frequency signal 932 will be made to pass a low-frequency component (almost DC component), and] to proper level, and will output the 2nd slice level 916 as shown in drawing 27 (2) by the thick wire. As shown in drawing 27 (2), the tracking of the 2nd slice level 916 is carried out to the envelope.

[0133] When reading BCA in the case of this invention, revolution phase control cannot be performed and tracking control cannot be performed, either. Therefore, an envelope is continuously changed like drawing 27 (1). If it is the slice level of immobilization, it will slice accidentally with the regenerative signal to change, and an error rate will worsen. It stops for this reason, being suitable as an object for data. However, in the circuit of drawing 26 of this invention, since he is trying to amend the 2nd slice level according to an envelope continuously, an incorrect slice decreases substantially.
[0134] Thus, in this invention, it is not influenced by the envelope to change, and the 2nd level slicer 587 slices the low frequency signal 932 with the 2nd slice level 916, and outputs the digital signal made binary as shown in drawing 27 (3). A signal is reversed in the standup of the digital signal which was outputted from the 2nd level slicer 587 and which was made binary, and a digital signal as shown in drawing 27 (4) is outputted. The frequency separation means 934 at this time and the concrete circuit of the 2nd level slice section 929 are shown in drawing 28 .
[0135] Thus, by setting up the 2nd slice level 916, the quantity of light fluctuation by the difference in the reflection factor of the disk to play and secular change of the laser for playback and low frequency level (DC level) fluctuation of 8 -16 modulating signal which happens by the truck cross at the time of playback can be absorbed, and the optical disk regenerative apparatus which can slice a BCA signal certainly can be realized.
[0136] Here, other setting-out approaches of the 2nd slice level 916 are explained. Other circuit diagrams of the frequency separation means 934 and the 2nd level slice section 929 are shown in drawing 29 . As shown in drawing 29 , LPF943 of the frequency-separation means 934 is constituted by 1st LPF943a with a small time constant, and 2nd LPF943b with a large time constant. The 2nd level slicer 587 of the 2nd level slicer section 929 is constituted by inversed amplifier 587a, DC regenerative-circuit 587b, comparator 587c, and 587d of two counting-down circuits. Moreover, a wave form chart required for this explanation is shown in drawing 31 .
[0137] Hereafter, actuation is explained. In a BCA field, the signal which lacked selectively the envelope as shown in drawing 31 (1) by existence of BCA is reproduced. This regenerative signal is inputted into 1st LPF943a and 2nd LPF943b of LPF943. In the 1LPF943a with a small time constant, the RF signal of 8 -16 modulation is removed from a regenerative signal, and a BCA signal is outputted. In the 2LPF943b with a large time constant, DC component of a regenerative signal passes and DC component of a regenerative signal is outputted. The amplitude to which the RF signal of 8 -16 modulation decreased by inversed amplifier 587a on the occasion of passage of 1st LPF943a when the repressed signal was inputted is amplified from the 1LPF943a. In DC regenerative-circuit 587b, DC playback of the amplified signal is carried out on GND level, and a signal as shown in drawing 31 (3) is inputted into comparator 587c. On the other hand, if DC component of a regenerative signal is inputted from the 2LPF943b, in the quantity of light reference-value setting-out section 588, it will be adjusted on ****** level by resistance division etc., and the 2nd slice level 916 as shown in drawing 31 (2) will be inputted into comparator 587c. Comparator 587c slices the output signal of DC regenerative-circuit 587b with the 2nd slice level 916, and outputs the digital signal made binary as shown in drawing 31 (4). In 587d of two counting-down circuits, a signal is reversed in the standup of the digital signal made binary by comparator 587c, and a digital signal is outputted.

[0138] The frequency separation means 934 at this time and the concrete circuit of the 2nd level slice section 929 are shown in drawing 30 . As mentioned above, by setting up the 2nd slice level 916 and reproducing a BCA signal, the quantity of light fluctuation by the difference in the reflection factor of a disk and the secular change of the laser for playback to reproduce and DC level variation of 8 -16 modulating signal which happens by the truck cross at the time of playback can be absorbed, and the optical disk regenerative apparatus which can slice a BCA signal certainly can be realized. Moreover, it is discrete, and when it constitutes this circuit, the BCA regenerative circuit where there are few element numbers and they are positive can be realized.
[0139] Moreover, if 587d of two counting-down circuits is used, when incorporating this signal to CPU, and it is soft and gets over, the clock frequency of PE modulating signal can be lowered to 1/2. For this reason, even if it is the case where CPU with a late sample frequency is used, the changing point of a signal is certainly detectable.
[0140] In addition, this effectiveness is acquired also by lowering the rotational frequency of a motor at the time of playback. This is explained using drawing 14 . When the playback instruction of BCA comes, rotational-speed reduced-speed-signal 923b is sent to the roll control section 26 by CPU923. Then, the roll control section 26 slows down the rotational frequency of a motor 17 to 1/2 or a quadrant. For this reason, the frequency of a regenerative signal falls, and even if it is the case where CPU with a late sample frequency is used, while it is soft and being able to get over, it is reproducible also by BCA with thin line breadth. In BCA, the BCA stripe of thin line breadth may be formed depending on works, but it can process also by low-speed CPU by lowering a rotational frequency. Consequently, the error rate at the time of BCA playback is improved, and dependability improves.
[0141] Only when [, such as 1X,] an error usually generates BCA in ** at the time of playback of reading and BCA, a slowdown instruction is slowed down in the roll control section 26 from CPU923, and one half is made to slow down the rotational frequency of delivery and a motor 17 in drawing 14 . If this approach is adopted, when reading BCA of average line breadth, the substantial reading rate of BCA does not fall at all. Although it becomes an error when line breadth is thin, an error is detectable by reading BCA at the rate of a chisel and one half in this case. Thus, lowering of the reproduction speed of BCA can be prevented by reading, only when the line breadth of BCA is thin, and decelerating a rate.
[0142] In addition, in drawing 14 , although LPF943 is used as a frequency-separation means 934, as long as it is the means which can oppress the high frequency signal of 8 -16 modulation from the regenerative signal of a BCA field, you may constitute from an envelope flattery circuit, a peak hold circuit, etc.
[0143] Moreover, after the frequency separation means 934 and the 2nd level slicer 929 make the regenerative signal of a BCA field direct binary, they may be inputted into a microcomputer etc., may perform discrimination processing of the time-axis of 8 -16 signal and a BCA signal using the point that are digital processing and edge intervals differ, and may constitute it from a means to perform processing which oppresses the RF signal of 8 -16 modulation substantially etc.
[0144] The modulating signal is recorded in the pit using eight to 16 modulation technique, and the RF signal 933 of drawing 14 is acquired. On the other hand, a BCA signal turns into the low frequency signal 932. Thus, in the case of DVD specification,

the main information is the RF signal 933 of about 4.5MHz of highest, and since subinformation is 8.92 microseconds of periods 932, i.e., about 100kHz low frequency signal, it can carry out the frequency separation of the subinformation easily using LPF943. By using the frequency-separation means 934 containing LPF943 as shown in drawing 14 , two signals are easily separable. In this case, LPF943 is good with an easy configuration.
[0145] The above is the outline of BCA. Drawing 32 is the block diagram of a disk manufacturing installation and a regenerative apparatus. As shown in drawing 32 , the lamination disk or the veneer disk 10 of the ROM mold of the same content or a RAM mold is manufactured by the disk manufacture department 19. In the disk manufacturing installation 21 Disks 10a, 10b, and 10c, Identification code 12a, such as ID which uses the BCA recorder 13 for ... and is different for every one one-sheet disk, PE modulation is carried out by PE modulation section 17, laser trimming of the BCA data 16a, 16b, and 16c containing 12b and 12c is carried out using an YAG laser, and circular bar code-like BCA(s) 18a, 18b, and 18c are formed on a disk 10. Hereafter, the entire disk on which BCA18 was recorded is called the BCA disks 11a, 11b, and 11c. As shown in drawing 32 , the pit section or the record signal of these BCA disks 11a, 11b, and 11c is completely the same. However, different ID from 1, 2, and 3 is recorded on BCA18 for every disk. Content providers, such as a movie company, memorize this different ID in the ID database 22. BCA data are simultaneously read with the bar code reader 24 which can read BCA at the time of shipment of a directory, and the supply place and supply time amount of of which ID to have supplied the disk to which system operator 23, i.e., a CATV firm, a broadcasting station, and an airline, are memorized in the ID database 22.
[0146] Record of to what system operator to have supplied the disk of which ID when is recorded on the ID database 22 by this. For this reason, when an illegal copy appears on the market to a large quantity by using a specific BCA disk as the source in the future, it can trace whether the illegal copy was performed from the BCA disk 11 supplied to which system operator by checking a true watermark. Although this actuation is explained to a detail later, since ID numbering by this BCA plays the same role as a watermark as the whole system virtually, it is called a "PURIWOTAMA king."
[0147] Here, the data which should be recorded on BCA are explained. ID is generated from ID generating section 26. Moreover, based on said ID, a watermark creation parameter is generated with a random number from the watermark creation parameter generating section 27. And said ID and said watermark creation parameter are mixed, and it signs in the digital signature section 28 using the private key of a public key system code function. BCA record of ID, a watermark creation parameter, and its signature data is carried out at each disks 10a, 10b, and 10c using the BCA recorder 13. Thereby, BCA(s) 18a, 18b, and 18c are formed.
[0148] In recording the main information, such as a video signal, on the above-mentioned BCA disks 11a, 11b, and 11c, as shown in drawing 41 , it reads the BCA signal which contains different ID first by the BCA playback section 39. And by the watermark adjunct 264, a BCA signal is superimposed, a video signal is changed, and the video signal after conversion is recorded on the BCA disks 11a, 11b, and 11c (drawing 41 300 (240,800)) by the record circuit 272. Moreover, in reproducing a video signal from the BCA disk 300 (240,800) with which the video signal with which it was superimposed on the BCA signal was recorded, first, the BCA signal of a disk is read in the BCA playback

section 39, and it detects as ID1 of a disk. Moreover, the video signal with which it was superimposed on the watermark is detected as a disk ID 2 in the watermark playback section. When a comparator compares ID1 read in the BCA signal, and the disk ID 2 read in the watermark of a video signal and both are not in agreement, playback of a video signal is suspended. Consequently, it is copied unjustly and a video signal cannot be reproduced from the disk with which it was superimposed on a different watermark from a BCA signal. On the other hand, when both are in agreement, scramble discharge is carried out by the descrambler 31 and the video signal with which it was superimposed on the watermark using ****** including ID information by which reading appearance was carried out from the BCA signal is outputted as a video signal.
[0149] Now, the BCA disks 10a, 10b, and 10c in which the disk manufacturing installation 21 acted as the "PURIWOTAMA king" as mentioned above are sent to system operators' 23a, 23b, and 23c regenerative apparatus 25a, 25b, and 25c. In drawing 32 , a part of block of retransmission-of-message equipment 28 is omitted on the relation of drawing creation.
[0150] The actuation by the side of a system operator is explained using drawing 34 and drawing 35 . The block diagram in which drawing 34 shows the detail of retransmission-of-message equipment, and drawing 35 are drawings showing the wave on the time-axis of the HARASHIN number and each video signal, and the wave on a frequency shaft.
[0151] As shown in drawing 34 , regenerative-apparatus 25a only for system operators is prepared in the retransmission-of-message equipment 28 installed in a CATV office etc., and it is equipped with disk 11a with BCA supplied by the movie company etc. at this regenerative-apparatus 25a. The main information of the signals reproduced by the optical head 29 is sent to the watermark section 34, after the data playback section 30 is reproduced, a scramble is canceled by the descrambler 31 and the HARASHIN number of an image is elongated by the MPEG decoder 33. In the watermark section 34, the HARASHIN number shown in drawing 35 (1) is inputted first, and it is changed into a frequency shaft from a time-axis by frequency-conversion section 34a, such as FFT. Thereby, frequency spectrum 35a as shown in drawing 35 (2) is obtained. Frequency spectrum 35a is mixed with ID signal which has the spectrum shown in drawing 35 (3) in the spectrum mixing section 36. Spectrum 35b of the mixed signal is not different from frequency spectrum 35a of the HARASHIN number shown in drawing 35 (2), as shown in drawing 35 (4). That is, it means that the spread spectrum of the ID signal was carried out. This signal is changed into a time-axis from a frequency shaft by the reverse frequency-conversion sections 37, such as IFFT, and the signal which is not different from the HARASHIN number (drawing 35 (1)) as shown in drawing 35 (5) is acquired. Since the spread spectrum of the ID signal is carried out in frequency space, there is little degradation of a picture signal.
[0152] Here, the creation approach of the ID signal 38 is explained. A signature is collated with the public key with which the BCA data reproduced by the BCA playback section 39 from BCA disk 11a were sent from the IC card 41 grade in the digital signature collating section 40. In the case of NG, actuation stops. Since data are not altered in O.K., ID is sent to watermark data origination section 41a as it is. Here, the signal of the watermark corresponding to ID signal shown in drawing 35 (3) is generated using said watermark creation parameter contained in BCA data. In addition, a watermark may be calculated from the card ID of ID data or IC card 41, and a watermark signal may

be generated.
[0153] If a watermark creation parameter and ID are recorded on BCA, it will become impossible in this case, to guess a watermark by the operation from ID, where correlation with ID and a watermark creation parameter is completely abolished. That is, only the copyright person will know the relation between ID and a watermark. For this reason, it can prevent that an illegal copy contractor publishes new ID and publishes a watermark unjustly.
[0154] It can embed into an image output signal by using the card ID of IC card 41 as a watermark by generating a spectrum signal using a specific operation from the card ID of IC card 41, and on the other hand, adding to the ID signal 38. In this case, since the both sides of the negotiation ID of software and ID of a regenerative apparatus can be checked, it becomes still easier, a trace, i.e., trace, of an illegal copy.
[0155] The image output signal of the watermark section 34 is sent to the output section 42. In transmitting the video signal with which retransmission-of-message equipment 28 was compressed, an image output signal is compressed with the MPEG encoder 43, and it scrambles with a scrambler 45 using the cryptographic key 44 of a system operator proper, and transmits to a viewer through a network or an electric wave from the transmitting section 46. In this case, since the compression parameter information 47, such as a transfer rate after compressing the original MPEG signal, is sent to the MPEG encoder 43 from the MPEG decoder 33, compression efficiency can be gathered even if it is real-time encoding. Moreover, since the compression sound signal 48 will not be elongated and compressed by making the watermark section 34 bypass, degradation of tone quality of it is lost.
[0156] Next, in not transmitting a compression signal, the image output signal 49 is scrambled as it is, and it transmits to a viewer through a network or an electric wave from transmitting section 46a. In the case of the show system in the aircraft, a scramble becomes unnecessary. In this way, the video signal into which the watermark went from disk 11a with BCA is transmitted.
[0157] In the case of drawing 34 , when an illegal copy contractor extracts the signal during each block from an intermediate bus, the watermark section 34 may be bypassed and a video signal may be taken out. In order to prevent this, the bus between a descrambler 31, the MPEG decoder 33, and the watermark section 34 is enciphered by the handshake method by mutual recognition section 32a, the mutual recognition sections 32b and 32c, and 32d of mutual recognition sections. while receiving the code signal which enciphered the signal by mutual recognition section 32c of a transmitting side in 32d of mutual recognition sections of a receiving side -- mutual recognition section 32c and 32d of mutual recognition sections -- mutual -- communication -- that is, a handshake is carried out. As for 32d of mutual recognition sections of a receiving side, this result cancels a code only to a right case. The same is said of the case of mutual recognition section 32a and mutual recognition section 32b. Thus, by the method of this invention, unless mutual recognition is carried out, a code is not canceled. For this reason, since a code is not canceled and the watermark section 34 cannot be eventually bypassed even if it extracts a digital signal from an intermediate bus, unjust abatement and an unjust alteration of a watermark can be prevented.
[0158] As shown in drawing 36 , the video signal 49 of entering [which was transmitted as mentioned above from the transmitting section 46 of the retransmission-of-message

equipment 28 by the side of a system operator] a watermark is received by the receiver 50 by the side of a user. In a receiver 50, when a scramble is canceled by the 2nd descrambler 51 and it is compressed, the MPEG decoder 52 develops and it is outputted to a monitor 54 as video-signal 49a from the output section 53.

[0159] Next, the case where an illegal copy is carried out is explained. With VTR55, it is recorded on a video tape 56, the video tape 56 on which the illegal copy of the large quantity was carried out appears on the market at a world, and, as for video-signal 49a, it infringes on a copyright person's access. However, when BCA of this invention is used, the watermark is attached also to video-signal 49b (refer to drawing 37) reproduced by video-signal 49a from the video tape 56. Since it is added in frequency space, a watermark cannot be erased easily. It does not disappear, even if it lets the usual record regeneration system pass.

[0160] Here, the detection approach of a watermark is explained using drawing 37 . The media 56 by which the illegal copy was carried out, such as a video tape and a DVD laser disk, are reproduced by regenerative-apparatus 55a, such as VTR and a DVD player, reproduced video-signal 49b is inputted into the 1st input section 58 of watermark detection equipment 57, and the 1st spectrum 60 which is the spectrum of the signal by which the illegal copy was carried out as shown in drawing 35 (7) by 1st frequency-conversion section 59a, such as FFT and DCT, is obtained. On the other hand, the original original copy contents 61 are inputted into 2nd input section 58a, it is changed into a frequency shaft by 2nd frequency-conversion section 59a, and 2nd spectrum 35a is obtained. This spectrum becomes like drawing 35 (2). the difference of the 1st spectrum 60 and 2nd spectrum 35a -- difference -- if it takes with a vessel 62 -- difference like drawing 35 (8) -- the spectrum signal 63 is acquired. this difference -- the spectrum signal 63 is made to input into the ID detecting element 64 the spectrum signal based on [in the ID detecting element 64, the watermark parameter of eye ID=n watch is taken out and (step 65) inputted from the ID database 22 (step 65a), and] a watermark parameter, and difference -- the spectrum signal 63 is compared (step 65b). subsequently, the spectrum signal based on a watermark parameter and difference -- it is distinguished whether the spectrum signal 63 is in agreement (step 65c). If both are in agreement, since it turns out that it is the watermark of ID=n, it is judged as ID=n (step 65d). When both are not in agreement, ID is changed into (n+1), the watermark parameter of eye ID= (n+1) watch is taken out from the ID database 22, the same step is repeated, and ID of a watermark is detected. ID of a spectrum corresponds with a right case, as shown in (3) of drawing 35 , and (8). In this way, ID of a watermark is outputted from the output section 66, and the source of an illegal copy becomes clear.

[0161] Since the source of a pirate edition disk or the contents of an illegal copy can be pursued by specifying ID of a watermark as mentioned above, copyright is protected.

[0162] An imagination watermark is realizable, if the same video signal as a ROM disk or a RAM disk is recorded and watermark information is recorded on BCA by the system which combined BCA and the watermark of this invention. When a system operator uses the regenerative apparatus of this invention, the watermark equivalent to ID which the content provider published altogether will be embedded as a result at the video signal outputted from a regenerative apparatus. Compared with the approach of recording the video signal with which watermarks differ for every conventional disk, disk cost and the disk production times are substantially reducible. Although a watermark circuit is

required for a regenerative apparatus, since FFT and IFFT are general, it does not become a big burden as a device for broadcast.
[0163] In addition, although explained using the watermark section of a spectrum diffusion method as an example, the same effectiveness is acquired even if it uses other watermark methods. In the case of the DVD-RAM disk 300 or a magneto-optic disk 240 In content providers, such as a CATV office with the magneto-optic-recording regenerative apparatus shown in the DVD record regenerative apparatus or drawing 42 shown in drawing 14 Considering the ID number of BCA as one key, the enciphered scramble data are sent to another record regenerative apparatus by the side of a user through a communication line from a content provider, and are once recorded on DVD-RAM disk 300a or magneto-optic-disk 240a, such as a CATV office. Since it is the operation of normal when reproducing from the same magneto-optic-disk 240a as having recorded this scramble signal, as shown in drawing 42 , a scramble is canceled by descrambling section, i.e., code decoder, 534a by using as a decode key the BCA data which were able to obtain BCA from reading and the BCA output section 750. And an MPEG signal is elongated by the MPEG decoder 261, and a video signal is acquired. However, since the BCA data of a disk differ when the scramble data recorded on magneto-optic-disk 240a of the operation of normal are copied to another magneto-optic-disk 240b (i.e., when it is used unjustly), and it reproduces, the right decode key for undoing scramble data is not obtained, and a scramble is not canceled by code decoder 534a. For this reason, a video signal is not outputted. Thus, since the signal unjustly copied to magneto-optic-disk 240b after the 2nd sheet is not reproduced, copyright is protected. As a result, contents cannot carry out record playback only at magneto-optic-disk of one sheet 240a. Record playback can be carried out only at the DVD-RAM disk of one sheet similarly [in DVD-RAM disk 300a shown in drawing 14].
[0164] The still more powerful protection approach is explained. First, the BCA data of magneto-optic-disk 240a by the side of a user are sent to a content provider side through a communication line. Next, in a content provider side, at the watermark Records Department 264, a video signal is embedded as a watermark, and this BCA data is transmitted. In a user side, this signal is recorded on magneto-optic-disk 240a. At the time of playback, in the watermark playback collating section 262, a record authorization identifier, and the BCA data of a watermark etc. and the BCA data obtained from the BCA output section 750 are collated, and only when in agreement, compound playback is permitted. Thereby, protection of copyright becomes still stronger. By this approach, since a watermark is detectable with the watermark playback section 263 even if digital one / analog copy is carried out from magneto-optic-disk 240a at a direct VTR tape, prevention or detection of a digital illegal copy can be performed. Prevention or detection of a digital illegal copy can be performed similarly [in DVD-RAM disk 300a shown in drawing 14].
[0165] In this case, record is permitted by the record prevention section 265 only when the watermark in which "a 1-time recordable identifier" is shown is in the signal received from the content provider by forming the watermark playback section 263 in a magneto-optic-recording regenerative apparatus or a DVD record regenerative apparatus. It is prevented by the record prevention section 265 and "the identifier recorded [1 time]" mentioned later, the 2nd record, i.e., illegal copy, to a disk.
[0166] Moreover, by the watermark Records Department 264, as a secondary watermark,

the individual disk number of the identifier which shows "finishing [1 time record]", and magneto-optic-disk 240a beforehand recorded on the BCA Records Department 220 is further superimposed on the record signal containing a primary watermark, is embedded to it, and is recorded on magneto-optic-disk 240a. if -- the data of this magneto-optic-disk 240a -- descrambling -- or since the above "the identifier recorded [1 time]" will be detected if that VTR etc. has equipped the watermark playback section 263 even if it once carries out analogue conversion and records on DVD-RAM, other media, for example, VTR tape, etc., the 2nd sheet and the record to 2 Motome are prevented by the record prevention section 265 of an illegal copy, and an illegal copy is prevented. In the case of VTR which does not equip the watermark playback section 263, it will be copied unjustly. However, since the record data of primary watermarks, such as record hysteresis information, for example, a content provider name etc., and the secondary watermark which was recorded on normal and with which the disk ID of BCA of the 1st record etc. was embedded are reproducible by investigating the watermark of the video tape copied illegally later, a follow-up survey of whether they are the contents supplied to which disk (whom) from which content provider on what [month / what] can be conducted. Therefore, since the individual who performed injustice can be specified, it can expose by the Copyright Act and the same malfeasance person's illegal copy and the plan of the same act can be prevented indirectly. Since it does not disappear even if it changes a watermark into an analog signal, Analog VTR of this actuation is also effective.
[0167] The circuit which detours even if it detects the watermark in which "finishing [1 time record]" or "prohibition on record" is shown, or creates a scramble key is added, and the case where it recorded or transmits with unjustly recordable equipment is explained. In this case, a detour circuit becomes very complicated although it cannot prevent directly. Moreover, since record progress can be specified with a primary watermark and a secondary watermark as described above, an illegal copy and an unauthorized use can be indirectly prevented like the above-mentioned case.
[0168] The concrete effectiveness of BCA is explained. Since BCA data can specify a disk and can specify the primary user of the contents recorded on a content provider's database from this data, an unauthorized use person's trace (trace) becomes easy by addition of BCA at the time of a watermark activity.
[0169] Moreover, if both sides are checked in the watermark playback section 263 of a regenerative apparatus by using BCA data for a part of cryptographic key of a scramble, and using BCA data for a primary watermark or a secondary watermark as shown in the record circuit 266 of drawing 14 or drawing 42 , an illegal copy can be prevented still more powerfully.
[0170] Furthermore, the key to which the day entry permitted to the watermark and the key of a scramble by system operators, such as a rental agency, from the hour entry input section 269 was added is given to the scramble section 271, or is compounded to password 271a. If playback collating of the day entry is carried out by the regenerative-apparatus side using password 271a, BCA data, or a watermark, in code decoder 534a, it is also possible to restrict the period of a scramble key which can be canceled, for example like "being usable for three days." It can also be used for such a rental disc system. Since it is protected by the above-mentioned anti-copying technique in the case of this invention, protection of copyrights is powerful and an unauthorized use becomes very difficult.

[0171] As described above, the protection of copyrights using a watermark or a scramble is strengthened more by using BCA for a rewritable optical disk like the magneto-optic disk used for ASMO, or DVD-RAM.
[0172] Moreover, in the gestalt of the above-mentioned implementation, although explained using the ROM disk of DVD of a two-sheet bonding type, the RAM disk, or the optical disk of veneer structure, according to this invention, it cannot be based on the configuration of a disk but the same effectiveness can be acquired over a disk at large. That is, even if it records BCA in other ROM disks, a RAM disk or a DVD-R disk, and a magneto-optic disk, the same recording characteristic and dependability are acquired. The explanation is omitted, although the same effectiveness is acquired even if it reads each explanation as a DVD-R disk, a DVD-RAM disk, and a magneto-optic disk.
[0173] Moreover, the BCA identification information in the gestalt of the above-mentioned implementation is an object for DVD, and an object for optical MAG, and since the format of an information signal etc. is common, it can reproduce the BCA identification information for DVD using the optical head 255 for the magneto-optic disks of a configuration of being shown in drawing 7 . And the regenerative signal of the outstanding BCA identification information with a small error rate can be acquired by adjusting a playback filter and the recovery conditions at the time of signal regeneration in this case.
[0174] Moreover, the outstanding dependability in which neither oxidation degradation of a recording layer nor change of a mechanical characteristic is also in an environmental test since the magneto-optic disk of the gestalt of the above-mentioned implementation is also only changing the magnetic properties of a recording layer is acquired.
[0175] Moreover, by the recording method shown in the gestalt of the above-mentioned implementation, although the magneto-optic disk with which a recording layer consists of a three-tiered structure of an FAD method was mentioned as the example and explained in the gestalt of the above-mentioned implementation, even if it is the magneto-optic disk in which super resolution playback of a RAD method, a CAD method, or a double mask method is possible, since identification information is easily recordable, while being able to prevent the duplicate of contents, it becomes the thing excellent also in the property of a detecting signal.
[0176]
[Effect of the Invention] As explained above, according to this invention, record playback of the identification information (postscript information) of an optical disk can be carried out by the easy approach, and the duplicate of contents can be prevented.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view showing the configuration of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 2] It is the sectional view showing other configurations of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 3] It is drawing showing the playback principle of the magneto-optic disk in the

gestalt of operation of this invention.
[Drawing 4] It is property drawing showing the car hysteresis loop in a direction vertical to the film surface of the BCA section by which the recording layer of the magneto-optic disk in the gestalt of operation of this invention is heat-treated, and the non-BCA section which is not heat-treated.
[Drawing 5] It is drawing showing the relation of the laser record current and BCA recording characteristic which record the identification information of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 6] The traced drawing showing the differential signal wave of the BCA signal at the time of record current 8A of a magneto-optic disk [in / in (a) / the gestalt of operation of this invention] and (b) are the traced drawing showing the addition signal wave form.
[Drawing 7] It is drawing showing the optical configuration of the record regenerative apparatus of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 8] It is process drawing showing the manufacture approach of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 9] It is process drawing showing the record approach of the identification information of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 10] It is the block diagram showing the test equipment of the BCA identification information of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 11] The mimetic diagram showing the situation of the BCA section when (a) records the identification information of the magneto-optic disk in the gestalt of operation of this invention by excessive record power, and (b) are the mimetic diagrams showing the situation of the BCA section when recording the identification information of the magneto-optic disk in the gestalt of operation of this invention by the optimal record power.
[Drawing 12] The mimetic diagram showing the result of having observed the mark of the BCA section when (a) records the BCA identification information of the magneto-optic disk in the gestalt of operation of this invention by excessive record power with the optical microscope and the polarization microscope, and (b) are the mimetic diagrams showing the result of having observed the mark of the BCA section when recording the BCA identification information of the magneto-optic disk in the gestalt of operation of this invention by the optimal record power with the optical microscope and the polarization microscope.
[Drawing 13] Drawing showing the rotatory polarization angle of the non-BCA section of a magneto-optic disk [in / in (a) / the gestalt of operation of this invention] and (b) are drawings showing the rotatory polarization angle of the BCA section of the magneto-optic disk in the gestalt of operation of this invention.
[Drawing 14] They are the regenerative apparatus of DVD-ROM in the gestalt of operation of this invention, and the record regenerative-apparatus **** block diagram of DVD.
[Drawing 15] It is the block diagram showing the stripe recording apparatus in the gestalt of operation of this invention.
[Drawing 16] It is drawing showing the signal wave form and trimming configuration of a case of RZ record in the gestalt of operation of this invention.

[Drawing 17] It is drawing showing the signal wave form and trimming configuration of a case of the PE-RZ record in the gestalt of operation of this invention.
[Drawing 18] The perspective view showing the section [in / in (a) / the gestalt of operation of this invention] condensing [optical] and (b) are drawings showing the stripe arrangement and the luminescence pulse signal in the gestalt of operation of this invention.
[Drawing 19] It is drawing showing arrangement of the stripe on the magneto-optic disk in the gestalt of operation of this invention, and the content of TOC data.
[Drawing 20] It is drawing showing the flow chart which changes CAV and CLV in stripe playback of the gestalt of operation of this invention.
[Drawing 21] Drawing showing the data configuration after ECC encoding [in / in (a) / the gestalt of operation of this invention], drawing showing the data configuration in n= 1 after ECC encoding [in / in (b) / the gestalt of operation of this invention], and (c) are drawings showing the ECC error correction capacity in the gestalt of operation of this invention.
[Drawing 22] Drawing in which (a) shows the data configuration of a synchronous sign, drawing in which (b) shows the wave of a fixed alignment pattern, and (c) are drawings showing storage capacity.
[Drawing 23] (a) is the block diagram of LPF and (b) is a wave form chart after an LPF addition.
[Drawing 24] A regenerative-signal wave form chart [in / in (a) / the gestalt of operation of this invention] and (b) are drawings for explaining the dimensional accuracy of the stripe in the gestalt of operation of this invention.
[Drawing 25] It is drawing showing the procedure which reads the TOC data in the gestalt of operation of this invention, and is reproduced.
[Drawing 26] It is the block diagram showing the 2nd level slice section in the gestalt of operation of this invention.
[Drawing 27] It is each part wave form chart at the time of binary-izing of the regenerative signal in the gestalt of operation of this invention.
[Drawing 28] It is the block diagram showing the concrete circuitry of the 2nd slice section in the gestalt of operation of this invention.
[Drawing 29] It is the block diagram showing the circuitry of the 2nd level slice section in the gestalt of operation of this invention.
[Drawing 30] It is the block diagram showing the concrete circuitry of the 2nd level slice section in the gestalt of operation of this invention.
[Drawing 31] It is drawing showing the actual signal wave form of each part when making binary the regenerative signal in the gestalt of operation of this invention.
[Drawing 32] It is the block diagram showing a content provider's disk manufacturing installation and a system operator's regenerative apparatus in the gestalt of operation of this invention.
[Drawing 33] It is the block diagram showing the disk manufacture department in the disk manufacturing installation in the gestalt of operation of this invention.
[Drawing 34] It is the block diagram showing the whole retransmission-of-message equipment and the regenerative apparatus by the side of the system operator in the gestalt of operation of this invention.
[Drawing 35] It is drawing showing the wave on the time-axis of the HARASHIN

number in the gestalt of operation of this invention, and each video signal, and the wave on a frequency shaft.
[Drawing 36] It is the block diagram showing the receiver by the side of the user in the gestalt of operation of this invention, and the retransmission-of-message equipment by the side of a system operator.
[Drawing 37] It is the block diagram showing the watermark detection equipment in the gestalt of operation of this invention.
[Drawing 38] It is the sectional view of the trimming by the pulse laser in the gestalt of operation of this invention.
[Drawing 39] It is the signal regeneration wave form chart of the trimming section in the gestalt of operation of this invention.
[Drawing 40] It is the sectional view showing the configuration of the optical disk in the gestalt of operation of this invention.
[Drawing 41] It is the block diagram showing the record regenerative apparatus of the optical disk in the gestalt of operation of this invention.
[Drawing 42] It is the block diagram showing the record regenerative apparatus of the magneto-optic disk in the gestalt of operation of this invention.
[Description of Notations]
3 Contents
4 MPEG Encoder
5 Original Recording Creation Machine
6 Original Recording
7 Making Machine
8 Substrate
9 Lamination Machine
10 Lamination Disk
11 BCA Disk
12 Identification Code
13 BCA Recorder
14 Code Encoder
15 Reflecting Layer Molding Machine
16 BCA Data
17 Motor
18 BCA
19 Disk Manufacture Department
20 Cryptographic Key
21 Disk Manufacturing Installation
22 ID Database
23 System Operator
24 PE Modulator
25 Regenerative Apparatus
26 ID Generating Section
27 Watermark Creation Parameter Generating Section
28 Retransmission-of-Message Equipment
29 Optical Head
30 Data Playback Section

31 Descrambler
32 Mutual Recognition Section
33 MPEG Decoder
34 Watermark Section
34a Frequency-conversion section
35 Frequency Spectrum
36 Spectrum Mixing Section
37 Reverse Frequency-Conversion Section
38 ID Number
39 BCA Playback Section
40 Digital Signature Collating Section
41 IC Card
42 Output Section
43 MPEG Encoder
44 Cryptographic Key (System Operator)
45 2nd Scrambler
46 Transmitting Section
47 Compression Parameter Information
48 Speech Compression Signal
49 Video Signal (Watermark is Entered)
50 Receiver
51 2nd Descrambler
52 MPEG Decoder
53 Output Section
54 Monitor
55 VTR
56 Medium
57 Watermark Detection Equipment
58 1st Input Section
59 1st Frequency-Conversion Section
60 1st Spectrum
61 Original Copy Contents
62 Difference -- Vessel
63 Difference -- Spectrum Signal
64 ID Detecting Element
65 Step
211 231 Disk substrate
212 232 Dielectric layer
213 Recording Layer
214 236 Medium dielectric layer
215 237 Reflecting layer
216 238 Overcoat layer
217 Magnetization Machine
218 Laser
219 One Direction Convergent Lens
220 The BCA Section

221 BCA Reader
222 Polarizer
223 Analyzer
224 The Non-BCA Section
225 Car Hysteresis Loop
226 BCA Image
227 Angle of Rotation of Reflected Light
233 Playback Magnetic Film
234 Medium Magnetic Film
235 Record Magnetic Film
584 Low Reflective Section
586 The Amount Detecting Element of Low Reflected Lights
587 Quantity of Light Level Comparator
588 Quantity of Light Reference Value
599 Low Reflective Section Initiation / Termination Location Detecting Element
600 Low Reflective Section Location Detecting Element
601 Low Reflective Section Angular-Position Signal Output Part
602 Low Reflective Section Angular-Position Detecting Element
605 Low Reflective Section Start Point
606 Point Ending [Low Reflective Section]
607 Time Lag Amendment Section
816 Disk Production Process
817 Secondary Record Process
818 Step of Disk Production Process
819 Step of Secondary Record Process
820 About One Software Work Step
830 Coding Means
831 Public Key System Encryption
833 1st Private Key
834 2nd Private Key
835 Synthetic Section
836 Record Circuit
837 Error Correction Coding Section
838 Reed-Solomon-Coding Section
839 Interleave Section
840 Pulse-Spacing-Modulation Section
841 Clock Signal Section
908 Serial Number Generating Section
909 Input Section
910 PE-RZ Modulation Section
913 Clock Signal Generating Section
915 Motor
915a Revolution sensor
916 2nd Slice Level
917 Cylindrical Lens
918 Mask

919 Focusing Lens
920 1st Time Slot
921 2nd Time Slot
922 3rd Time Slot
923 Stripe
924 Pulse
925 1st Record Section
926 2nd Record Section
927 ECC Encoder
928 ECC Decoder
929 Laser Power Circuit
931 Light Deflector
932 Slit
933 Stripe
934 SubStripe
935 Deflection Signal Generator
936 TOC Field
937 Stripe Existence Identifier
938 Postscript Stripe Section
939 Postscript Stripe Existence Identifier
940 Step of Flow Chart Which Reproduces Stripe Existence Identifier
941 Optical Marking of Pinhole
942 PE-RZ Recovery Section
943 LPF
944 Address Field
945 Main Beam
946 SubBeam
948 Stripe Rear-Face Existence Identifier
949 Stripe Null Section
950 Scanning Means
951 Data Line
952 ECC Line
953 Edge Spacing Detection Means
954 Comparison Means
955 Memory Means
956 Oscillator
957 Controller
958 Motorised Circuit
959 Bar Code Reading Means
963 Mode Switch
964 Head Migration Means
965 Frequency Comparator
966 Oscillator
967 Frequency Comparator
968 Oscillator
969 Motor